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AUGUST 2004

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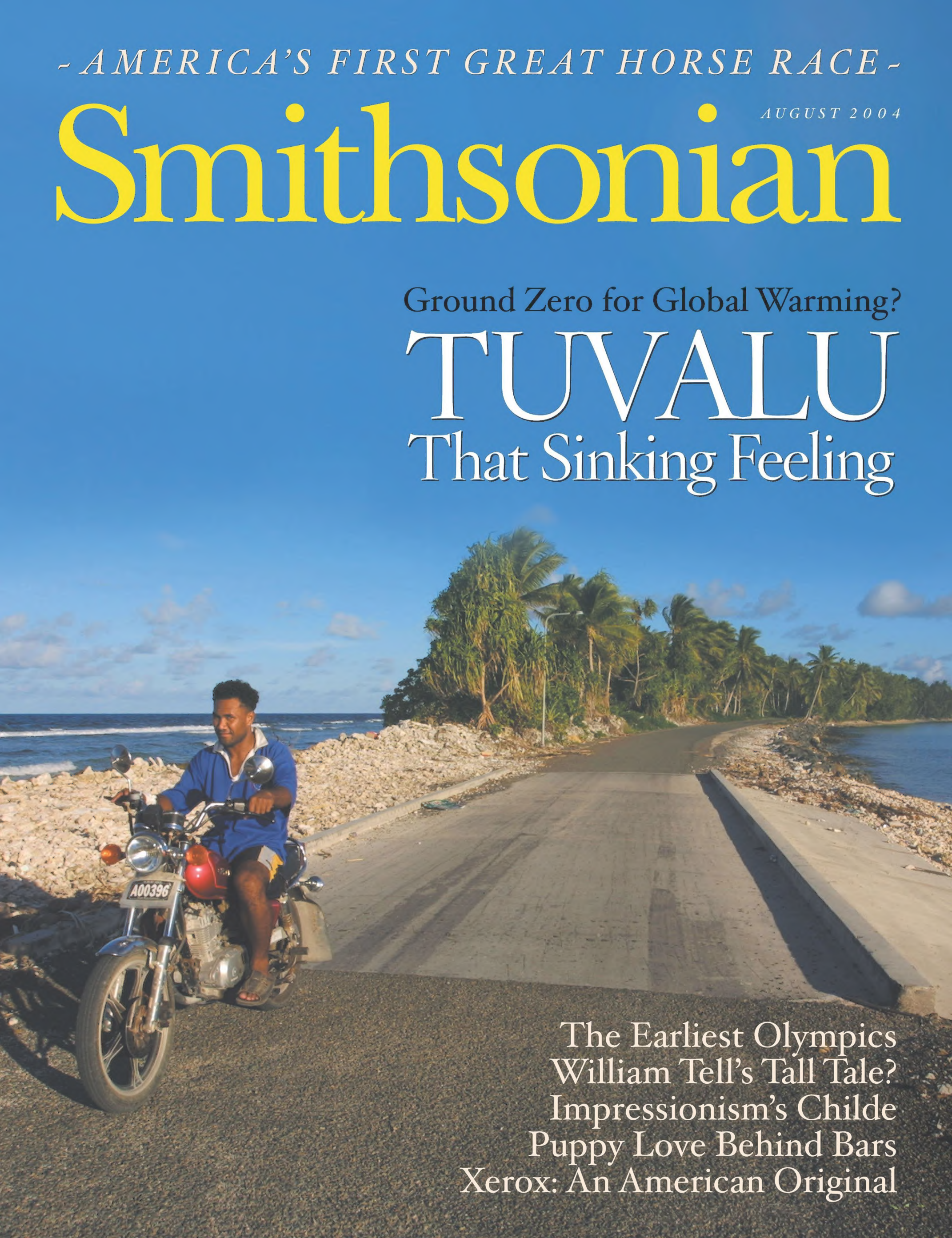

The Earliest Olympics
William Tell's Tall Tale?
Impressionism's Childe
Puppy Love Behind Bars
Xerox: An American Original

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** General Motors Corp. – Lansing Grand River, MI (Car) plant was the highest ranked and the General Motors Corp. – Hamtramck, MI plant was the second highest ranked in North/South America among plants producing vehicles for the U.S. market. J.D. Power and Associates 2003-2004 Initial Quality Studies[SM] 2004 Study based on a total of 51,208 U.S. consumer responses including owner reported problems during the first 90 days of ownership. www.jdpower.com

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AUGUST 2004 VOLUME 35, NUMBER 5

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ON THE COVER The islands of Tuvalu, scattered midway between Hawaii and Australia, may vanish entirely within a few decades, say the nation's leaders. *PHOTOGRAPH BY PATRICK AVENTURIER / GAMMA*

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PATRICK AVENTURIER / GAMMA; METROPOLITAN MUSEUM OF ART, ROGERS FUND, 1910; DETAIL: AMERICAN ACADEMY OF ARTS AND LETTERS, NEW YORK; ENRICO FERORELLI

Smithsonian
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It's different for people with acid reflux disease.

It's not just heartburn you may have to worry about, but the threat of a damaged esophagus.

If you suffer from acid reflux disease, any food can trigger an attack of heartburn. And over time, all that churning acid could do real harm to your esophagus. So, if you've changed your diet and treated your symptoms, but the heartburn still comes back two or more days a week, ask your doctor about prescription NEXIUM.

Unlike your stomach, the lining of your esophagus offers little protection against churning acid. When acid rises into the esophagus–even if you feel only a little heartburn–it can eventually wear away the lining. This condition is called erosive esophagitis and only a doctor can determine if you have it.

That's why you should ask your doctor about NEXIUM. The Healing Purple Pill. For many, just one NEXIUM a day–along with a sensible diet and lifestyle changes–can mean 24-hour heartburn relief. And NEXIUM goes deeper, for most people healing the erosions in your esophagus caused by acid reflux disease. Most erosions heal in 4 to 8 weeks. Your results may vary.

NEXIUM has a low occurrence of side effects, the most common being headache, diarrhea, and abdominal pain. Symptom relief does not rule out serious stomach conditions.

Next time, ask your doctor about NEXIUM. The Healing Purple Pill.
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Nexium® *(esomeprazole magnesium)*

20-MG, 40-MG Delayed-Release Capsules

BRIEF SUMMARY Before prescribing NEXIUM, please see full Prescribing Information. **INDICATIONS AND USAGE** NEXIUM is indicated for the short-term treatment (4 to 8 weeks) in the healing and symptomatic resolution of diagnostically confirmed erosive esophagitis. **CONTRAINDICATIONS** NEXIUM is contraindicated in patients with known hypersensitivity to any component of the formulation or to substituted benzimidazoles. **PRECAUTIONS** Symptomatic response to therapy with NEXIUM does not preclude the presence of gastric malignancy. Atrophic gastritis has been noted occasionally in gastric corpus biopsies from patients treated long-term with omeprazole, of which NEXIUM is an enantiomer. **Information for Patients** NEXIUM Delayed-Release Capsules should be taken at least one hour before meals. For patients who have difficulty swallowing capsules, one tablespoon of applesauce can be added to an empty bowl and the NEXIUM Delayed-Release Capsule can be opened, and the pellets carefully emptied onto the applesauce. The pellets should be mixed with the applesauce and then swallowed immediately. The applesauce used should not be hot and should be soft enough to be swallowed without chewing. The pellets should not be chewed or crushed. The pellet/applesauce mixture should not be stored for future use. Antacids may be used while taking NEXIUM. **Drug Interactions** Esomeprazole is extensively metabolized in the liver by CYP2C19 and CYP3A4. *In vitro* and *in vivo* studies have shown that esomeprazole is not likely to inhibit CYPs 1A2, 2A6, 2C9, 2D6, 2E1 and 3A4. No clinically relevant interactions with drugs metabolized by these CYP enzymes would be expected. Drug interaction studies have shown that esomeprazole does not have any clinically significant interactions with phenytoin, warfarin, quinidine, clarithromycin or amoxicillin. Post-marketing reports of changes in prothrombin measures have been received among patients on concomitant warfarin and esomeprazole therapy. Increases in INR and prothrombin time may lead to abnormal bleeding and even death. Patients treated with proton pump inhibitors and warfarin concomitantly may need to be monitored for increases in INR and prothrombin time. Esomeprazole may potentially interfere with CYP2C19, the major esomeprazole metabolizing enzyme. Coadministration of esomeprazole 30 mg and diazepam, a CYP2C19 substrate, resulted in a 45% decrease in clearance of diazepam. Increased plasma levels of diazepam were observed 12 hours after dosing and onwards. However, at that time, the plasma levels of diazepam were below the therapeutic interval, and thus this interaction is unlikely to be of clinical relevance. Esomeprazole inhibits gastric acid secretion. Therefore, esomeprazole may interfere with the absorption of drugs where gastric pH is an important determinant of bioavailability (eg, ketoconazole, iron salts and digoxin). Coadministration of oral contraceptives, diazepam, phenytoin, or quinidine did not seem to change the pharmacokinetic profile of esomeprazole. **Carcinogenesis, Mutagenesis, Impairment of Fertility** The carcinogenic potential of esomeprazole was assessed using omeprazole studies. In two 24-month oral carcinogenicity studies in rats, omeprazole at daily doses of 1.7, 3.4, 13.8, 44.0 and 140.8 mg/kg/day (about 0.7 to 57 times the human dose of 20 mg/day expressed on a body surface area basis) produced gastric ECL cell carcinoids in a dose-related manner in both male and female rats; the incidence of this effect was markedly higher in female rats, which had higher blood levels of omeprazole. Gastric carcinoids seldom occur in the untreated rat. In addition, ECL cell hyperplasia was present in all treated groups of both sexes. In one of these studies, female rats were treated with 13.8 mg omeprazole/kg/day (about 5.6 times the human dose on a body surface area basis) for 1 year, then followed for an additional year without the drug. No carcinoids were seen in these rats. An increased incidence of treatment-related ECL cell hyperplasia was observed at the end of 1 year (94% treated vs 10% controls). By the second year the difference between treated and control rats was much smaller (46% vs 26%) but still showed more hyperplasia in the treated group. Gastric adenocarcinoma was seen in one rat (2%). No similar tumor was seen in male or female rats treated for 2 years. For this strain of rat no similar tumor has been noted historically, but a finding involving only one tumor is difficult to interpret. A 78-week mouse carcinogenicity study of omeprazole did not show increased tumor occurrence, but the study was not conclusive. Esomeprazole was negative in the Ames mutation test, in the *in vivo* rat bone marrow cell chromosome aberration test, and the *in vivo* mouse micronucleus test. Esomeprazole, however, was positive in the *in vitro* human lymphocyte chromosome aberration test. Omeprazole was positive in the *in vitro* human lymphocyte chromosome aberration test, the *in vivo* mouse bone marrow cell chromosome aberration test, and the *in vivo* mouse micronucleus test. The potential effects of esomeprazole on fertility and reproductive performance were assessed using omeprazole studies. Omeprazole at oral doses up to 138 mg/kg/day in rats (about 56 times the human dose on a body surface area basis) was found to have no effect on reproductive performance of parental animals. **Pregnancy** *Teratogenic Effects. Pregnancy Category B*—Teratology studies have been performed in rats at oral doses up to 280 mg/kg/day (about 57 times the human dose on a body surface area basis) and in rabbits at oral doses up to 86 mg/kg/day (about 35 times the human dose on a body surface area basis) and have revealed no evidence of impaired fertility or harm to the fetus due to esomeprazole. There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if clearly needed. Teratology studies conducted with omeprazole in rats at oral doses up to 138 mg/kg/day (about 56 times the human dose on a body surface area basis) and in rabbits at doses up to 69 mg/kg/day (about 56 times the human dose on a body surface area basis) did not disclose any evidence for a teratogenic potential of omeprazole. In rabbits, omeprazole in a dose range of 6.9 to 69.1 mg/kg/day (about 5.5 to 56 times the human dose on a body surface area basis) produced dose-related increases in embryo-lethality, fetal resorptions, and pregnancy disruptions. In rats, dose-related embryo/fetal toxicity and postnatal developmental toxicity were observed in offspring resulting from parents treated with omeprazole at 13.8 to 138.0 mg/kg/day (about 5.6 to 56 times the human doses on a body surface area basis). There are no adequate and well-controlled studies in pregnant women. Sporadic reports have been received of congenital abnormalities occurring in infants born to women who have received omeprazole during pregnancy. **Nursing Mothers** The excretion of esomeprazole in milk has not been studied. However, omeprazole concentrations have been measured in breast milk of a woman following oral administration of 20 mg. Because esomeprazole is likely to be excreted in human milk, because of the potential for serious adverse reactions in nursing infants from esomeprazole, and because of the potential for tumorigenicity shown for omeprazole in rat carcinogenicity studies, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother. **Pediatric Use** Safety and effectiveness in pediatric patients have not been established. **Geriatric Use** Of the total number of patients who received NEXIUM in clinical trials, 778 were 65 to 74 years of age and 124 patients were ≥ 75 years of age. No overall differences in safety and efficacy were observed between the elderly and younger individuals, and other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity of some older individuals cannot be ruled out. **ADVERSE REACTIONS** The safety of NEXIUM was evaluated in over 10,000 patients (aged 18-84 years) in clinical trials worldwide including over 7,400 patients in the United States and over 2,600 patients in Europe and Canada. Over 2,900 patients were treated in long-term studies for up to 6-12 months. In general, NEXIUM was well tolerated in both short- and long-term clinical trials. The safety in the treatment of healing of erosive esophagitis was assessed in four randomized comparative clinical trials, which included 1,240 patients on NEXIUM 20 mg, 2,434 patients on NEXIUM 40 mg, and 3,008 patients on omeprazole 20 mg daily. The most frequently occurring adverse events (≥1%) in all three groups was headache (5.5, 5.0, and 3.8, respectively) and diarrhea (no difference among the three groups). Nausea, flatulence, abdominal pain, constipation, and dry mouth occurred at similar rates among patients taking NEXIUM or omeprazole. Additional adverse events that were reported as possibly or probably related to NEXIUM with an incidence < 1% are listed below by body system: ***Body as a Whole:*** abdomen enlarged, allergic reaction, asthenia, back pain, chest pain, chest pain substernal, facial edema, peripheral edema, hot flushes, fatigue, fever, flu-like disorder, generalized edema, leg edema, malaise, pain, rigors; ***Cardiovascular:*** flushing, hypertension, tachycardia; ***Endocrine:*** goiter; ***Gastrointestinal:*** bowel irregularity, constipation aggravated, dyspepsia, dysphagia, dysplasia GI, epigastric pain, eructation, esophageal disorder, frequent stools, gastroenteritis, GI hemorrhage, GI symptoms not otherwise specified, hiccup, melena, mouth disorder, pharynx disorder, rectal disorder, serum gastrin increased, tongue disorder, tongue edema, ulcerative stomatitis, vomiting; ***Hearing:*** earache, tinnitus; ***Hematologic:*** anemia, anemia hypochromic, cervical lymphoadenopathy, epistaxis, leukocytosis, leukopenia, thrombo-cytopenia; ***Hepatic:*** bilirubinemia, hepatic function abnormal, SGOT increased, SGPT increased; ***Metabolic/Nutritional:*** glycosuria, hyperuricemia, hyponatremia, increased alkaline phosphatase, thirst, vitamin B12 deficiency, weight increase, weight decrease; ***Musculoskeletal:*** arthralgia, arthritis aggravated, arthropathy, cramps, fibromyalgia syndrome, hernia, polymyalgia rheumatica; ***Nervous System/Psychiatric:*** anorexia, apathy, appetite increased, confusion, depression aggravated, dizziness, hypertonia, nervousness, hypoesthesia, impotence, insomnia, migraine, migraine aggravated, paresthesia, sleep disorder, somnolence, tremor, vertigo, visual field defect; ***Reproductive:*** dysmenorrhea, menstrual disorder, vaginitis; ***Respiratory:*** asthma aggravated, coughing, dyspnea, larynx edema, pharyngitis, rhinitis, sinusitis; ***Skin and Appendages:*** acne, angioedema, dermatitis, pruritus, pruritus ani, rash, rash erythematous, rash maculo-papular, skin inflammation, sweating increased, urticaria; ***Special Senses:*** otitis media, parosmia, taste loss, taste perversion; ***Urogenital:*** abnormal urine, albuminuria, cystitis, dysuria, fungal infection, hematuria, micturition frequency, moniliasis, genital moniliasis, polyuria; ***Visual:*** conjunctivitis, vision abnormal. Endoscopic findings that were reported as adverse events include: duodenitis, esophagitis, esophageal stricture, esophageal ulceration, esophageal varices, gastric ulcer, gastritis, hernia, benign polyps or nodules, Barrett's esophagus, and mucosal discoloration. Postmarketing Reports – There have been spontaneous reports of adverse events with postmarketing use of esomeprazole. These reports have included rare cases of anaphylactic reaction. Other adverse events not observed with NEXIUM, but occurring with omeprazole can be found in the omeprazole package insert, **ADVERSE REACTIONS** section. **OVERDOSAGE** A single oral dose of esomeprazole at 510 mg/kg (about 103 times the human dose on a body surface area basis), was lethal to rats. The major signs of acute toxicity were reduced motor activity, changes in respiratory frequency, tremor, ataxia, and intermittent clonic convulsions. There have been some reports of overdosage with esomeprazole. Reports have been received of overdosage with omeprazole in humans. Doses ranged up to 2,400 mg (120 times the usual recommended clinical dose). Manifestations were variable, but included confusion, drowsiness, blurred vision, tachycardia, nausea, diaphoresis, flushing, headache, dry mouth, and other adverse reactions similar to those seen in normal clinical experience (see omeprazole package insert-**ADVERSE REACTIONS**). No specific antidote for esomeprazole is known. Since esomeprazole is extensively protein bound, it is not expected to be removed by dialysis. In the event of overdosage, treatment should be symptomatic and supportive. As with the management of any overdose, the possibility of multiple drug ingestion should be considered. For current information on treatment of any drug overdose, a certified Regional Poison Control Center should be contacted. Telephone numbers are listed in the Physicians' Desk Reference (PDR) or local telephone book.

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Chinese Government Ignites World's Biggest Gold Rush

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OCTOBER - DECEMBER 2004

Welcome to CultureSpotter.com, a monthly listing of some of the most interesting cultural events around the globe. *(Dates subject to change)*

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October 5 - 16
FLANDERS INTERNATIONAL FILM FESTIVAL – GHENT
Ghent, Belgium
www.filmfestival.be

October 14 - 24
VEGETARIAN FESTIVAL
Phuket Town, Thailand
www.phuket.com

October 22
JIDAI MATSURI [FESTIVAL OF THE AGES]
Kyoto, Japan
www.kyoto-np.co.jp/kp/english

November 8 - 11
BONN OM TOUK [WATER FESTIVAL]
Phnom Penh, Cambodia
www.phnompenh.gov.kh

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CAROLINA HOLIDAY FLOTILLA
Wrightsville Beach and Banks Channel, NC
www.ncholidayflotilla.org

November 30 - December 10
CAIRO INTERNATIONAL FILM FESTIVAL
Cairo, Egypt
www.cairofilmfest.com

December 3 - 18
SWAN HELLENIC CRUISE
Mauritius to Cape Town
www.swanhellenic.com

December 27 - January 1
WOODFORD FOLK FESTIVAL
Near Brisbane, Queensland, Australia
www.woodfordfolkfestival.com

FEATURED EVENT

SMITHSONIAN MAGAZINE'S CULTUREFEST IS COMING!
Enjoy discussions, demonstrations, performances and more with Smithsonian editors, experts and artists in Phoenix and Scottsdale, AZ, from November 10 - 14. This cultural celebration will explore jazz, Mexican heritage, Western folklore, ecology, Native American artistry, space exploration, gems and minerals. For details, visit www.culturefest.com or call (800) 774-5020.

SMITHSONIAN MAGAZINE'S
2004
CultureFest

Fault Lines

Weighing threats on land and from the sea

BY CAREY WINFREY

IN 25 YEARS of writing magazine articles about some of the planet's more remote destinations, Leslie Allen never got to Tuvalu. She even began to wonder if it existed. Some world maps don't bother to show Tuvalu, a constellation of small islands scattered across 500,000 square miles of Pacific Ocean, and the United States maintains no embassy there. Her travel agent had never heard of the place and couldn't find it in her computer system. "It was eerie," says Allen, who wrote our cover story ("Will Tuvalu Disappear Beneath the Sea?" p. 44). "Only after I located the code for the country's only airport did I begin to make headway. But the travel agent thought I was pulling her leg when I gave her the airport code: FUN, for Funafuti, the capital city."

Allen: FUN in Tuvalu.

FUN may seem an ironic identifier for a nation worried about destruction by storms, flooding, rising seas and other possible consequences of global warming, but, says Allen, "after I finally got there, I found that most Tuvaluans live their lives pretty much like Californians living on the San Andreas fault: with concern but without panic. They're building homes, showing off their new hospital and, in general, planning for the long term. They're even having FUN."

OVER THE YEARS Robert Wernick has written for SMITHSONIAN about everything from the misunderstood goat to John Ringling, the circus king. His 84th article for this magazine—a record for features—is about Switzerland's legendary founding father ("In Search of William Tell," p. 70). "I believe that one of the reasons the Swiss have felt so close to William Tell all these hundreds of years is that he is so unlike what most foreigners think of as an average Switzer—cautious, conservative, beer-drinking, bankbook-balancing and eternally safe," says Wernick. "But the Swiss know that Switzerland is not as safe as all that. It is a valuable piece of property plunked down in the middle of Europe surrounded by mighty warlike nations.

Wernick: Do Tell.

"Hitler could have gobbled it up in a few days, and plans were drawn up for an invasion. It was never carried out because the Swiss had put tons of explosives in the railway tunnels under the Alps, ready to blow the day the first German soldier crossed the frontier. Or so the Swiss believe. But one old man who had been part of this operation told me that the thrifty government had decided this would be too expensive—they only sent engineers to make excavations at the tunnel entrances. The country was full of German spies, of course, who could not all have been fooled, but they apparently thought it wiser not to let Berlin know the truth for the obvious reason that an invasion would have put them out of a job, and they would have been sent to the Russian front to get killed." Actually the Nazis glorified Tell (for a while), but then—let Wernick's story do the telling.

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CRYSTAL CRUISES

Natural Harmony

The new National Museum of the American Indian is a proud expression of Native American beliefs

WHEN W. RICHARD WEST JR. WAS appointed founding director of the Smithsonian's National Museum of the American Indian (NMAI) in 1990, he was put in charge of a great collection and a vision. During the next 14 years, Rick West gradually set the contours of the vision in stone, so that the collection—some 800,000 artifacts gathered largely in the early decades of the 20th century by the American businessman George Gustav Heye—might be displayed as befits its remarkable distinction. NMAI now has three buildings. The Heye Center opened in the U.S. Custom House in Lower Manhattan in 1994. The Cultural Resources Center, a study and collections facility just outside Washington, was completed in 1998. And the third and most striking—on a 4.25-acre site between the U.S. Capitol and the National Air and Space Museum—will be dedicated in September. The new museum will forever alter and immeasurably enlarge the world's sense of the native peoples of the Americas.

The Smithsonian buildings lining the National Mall are unlikely to be mistaken for anything but museums. But museums of what exactly? The exteriors—all but one—are mum about their purpose. The exception is the new National Museum of the American Indian, a monumental structure unlike any of its neighbors. The architecture and setting, informed by Native American beliefs about the need for harmony between the built environment and the natural world, invite visitors to read the building's intention as they approach. The museum is oriented due east, and its undulant limestone walls appear to have been carved by the elements; flowing water and rocks and plants embellish the landscape. Inside and out, the building is a spectacular public gesture of cultural homage.

No one deserves more credit for NMAI's successful evolution than Rick West. Man and mission were ideally suited. Rick was raised in Oklahoma and is a citizen of the Cheyenne and Arapaho tribes of Oklahoma and a chief of the Southern Cheyenne. He holds degrees in history and law, and before becoming director of NMAI, he was a partner in the Washington office of an international law firm and in the Albuquerque office of an Indian-owned firm. He has acted as counsel to numerous Indian tribes and organizations—before federal, state and tribal courts, departments of the federal government, and the Congress itself. But what matters above all for NMAI is that Rick's superb professional credentials are in the service of unwavering commitment, sure judgment, personal warmth, a diplomat's savvy and a temperament immune to setback and delay.

West (at NMAI): Turning bumps into blessings.

The years brought more than their share of moments that someone other than Rick might have called crises: the Mall museum underwent a change of architects; its projected cost rose from an initial estimate of $100 million to a sobering $200 million; the act of Congress that authorized the museum provided as well for the repatriation of artifacts to native peoples, thereby threatening a diminishment of the collection. Rick did not allow himself the luxury of alarm. The difficult moments were just that, moments, inevitable in the realization of so grand a project, bumps perhaps, but better thought of as blessings, because each was a new incentive to persevere, and perseverance would bring the goal ever closer.

In the end, the new architects did not compromise the creative vision of the original team; the additional $100 million of private and public support for the building was secured; and thanks to Rick's relations with native peoples and his ability to persuade them of the museum's good faith, repatriation has not threatened the collection. Rick made every obstacle a mere way station on the road to a destination he never doubted would be reached. In his mind, the outcome was always inevitable—and triumphant. His is the faith that's a match for mountains.

Lawrence M. Small
SECRETARY OF THE SMITHSONIAN INSTITUTION

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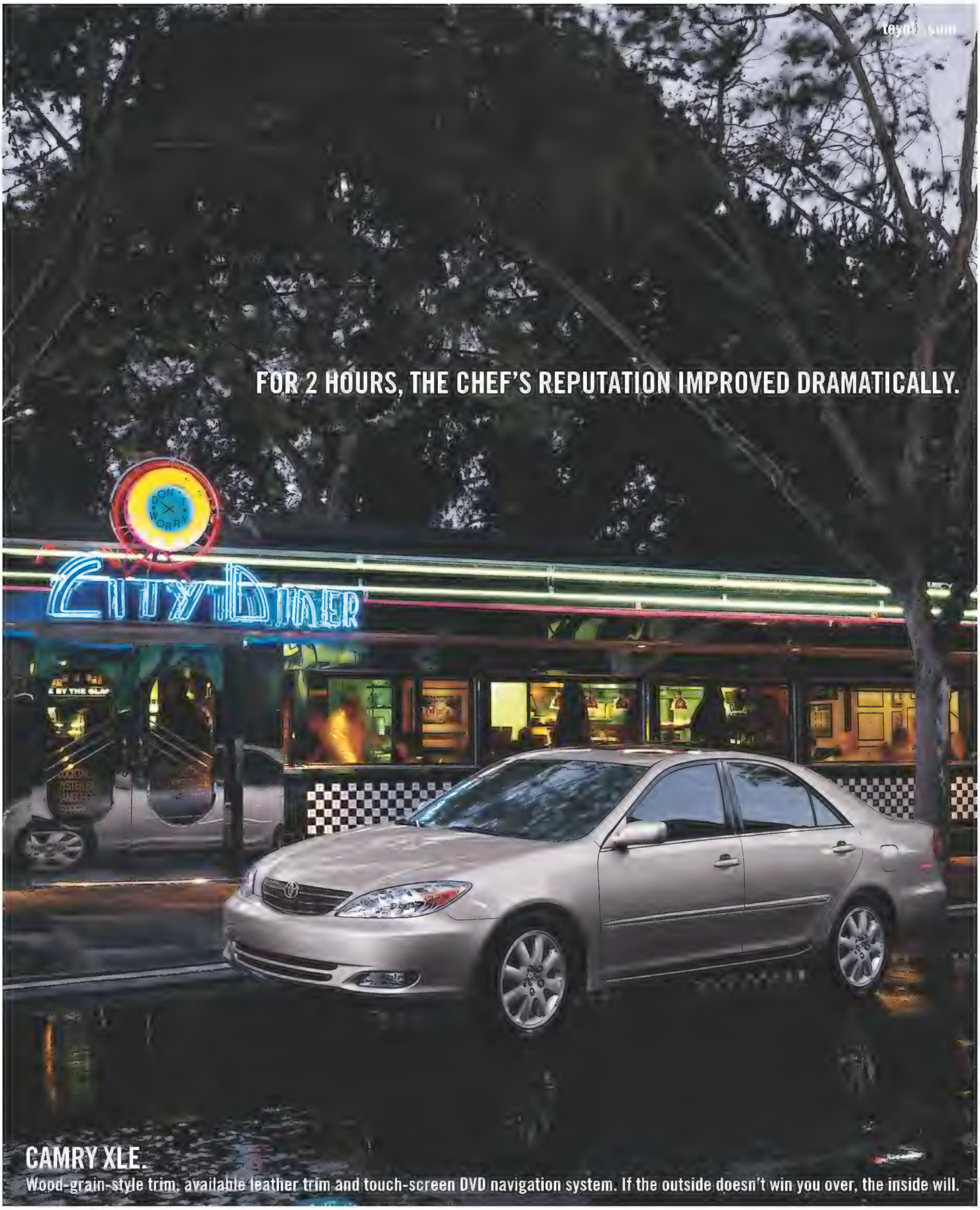
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LETTERS

Readers respond to the June issue:

MADE IN THE SHADE

QUITE CONTRARY to the dismissive suggestion in "Can Great Coffee Save the Jungle?" that Oxfam America's coffee rescue plan is a "charity-dependent idea," it is a model program. Small farmers produce some of the finest quality coffee in the world, but many face great challenges selling to markets. They must diversify their crops to survive, but a lack of access to credit for capital investment often prevents them from doing so. Our efforts, which have involved more than 26,000 small coffee farmers in six Central American and African nations, help farmers work with industry, financial and civic leaders to address the poverty brought on by plummeting coffee prices.

SETH PETCHERS
OXFAM AMERICA
BOSTON, MASSACHUSETTS

WE WERE HEARTENED to see Katherine Ellison make the case that good-quality coffee must be linked to the quality of the social and physical landscapes in which it is produced. It *is* about shade, as she states, but also for other reasons—the principal one being viable bird habitat. Smithsonian researchers have established criteria now used in the industry to certify organically grown coffee with good shade characteristics as "Bird Friendly." Certified shade coffees exist in the marketplace—and certification is the real way to link environmental quality to cup quality.

DR. ROBERT A. RICE
SMITHSONIAN MIGRATORY BIRD CENTER
WASHINGTON, D.C.

PERHAPS COFFEE DRINKERS will become unsung ecological heroes for drinking coffee made from beans grown in rain forests that also provide shelter to bats and birds.

PAUL DALE ROBERTS
ELK GROVE, CALIFORNIA

RAPID TRANSIT SWINDLE?

CLARENCE KING AND his colleagues' investigation ("The Great Diamond Hoax of 1872") remains a fine example of government science in the public service. It's a source of pride to all who labor in the historically minded U.S. Geological Survey (where I served as a historian from 1976 to 1984). None of the many writings about the hoax that I've seen point out how much it depended on the transcontinental railroad, finished in 1869. Neither the salting of the site with precious stones nor the discovery of the fraud could ever have taken place had the railroad not provided rapid transportation to San Francisco and New York for the swindlers, their victims and the geologists who unmasked the fraud.

HAROLD L. BURSTYN
SYRACUSE, NEW YORK

MODEL MUDDLE

I ENJOYED your photo contest, "Treasure Trove," but being a car buff I have to point out that the Ford pictured on page 62 is not a 1948 model, as stated, but a 1949.

ROBERT M. MINOR
PORTLAND, OREGON

We hereby grant you full membership in the "It's a '49, You Dummies" Club, whose membership continues to grow. —Ed.

BELIEVE IT OR NOT

I FINALLY UNDERSTOOD my grandfather's complaints after reading the "This Month in History" item, "Ironic Act" (about the law signed by President Coolidge granting citizenship to Indians). Who would ever believe that American Indians were not all citizens of this country until 1924? And could not vote in every state until 1948? Also, the picture speaks volumes to me; I hear the words of my grandfather again, and my American Indian heritage reminds me of who I am and from where I've come.

ROC M. WATERS
LITTLE NECK, NEW YORK

A BREED APART

KUDOS TO Francesca Kelly ("Saving the Raja's Horse") for her efforts in reviving the Marwari horse of India. It is in preserving such endangered breeds that we are made to understand the importance of all native breeds.

NANCI FALLEY
PRESIDENT, AMERICAN INDIAN HORSE REGISTRY
LOCKHART, TEXAS

WONDERS NEVER CEASE

I WAS GROCERY SHOPPING the other day and overheard the deli employees trying to list the Seven Wonders of the World. They were guessing the Taj Mahal, the Grand Canyon, Niagara Falls and the like. I interrupted and explained that none of those was among the Seven Wonders. I then named the real ones. When I saw the look in their eyes of "My gosh, she must be really, really smart!" I felt I had to tell them, "I just read about this in SMITHSONIAN."

MARGARET BONHAM
BOLTON, VERMONT

Please send letters to LettersEd@simag.si.edu or to **Letters, Smithsonian, MRC 951, P.O. Box 37012, Washington, D.C. 20013.** Include a telephone number and address. Letters may be edited for clarity or space. Because of the high volume of mail we receive, we cannot respond to all letters. Send queries about the Smithsonian Institution to info@si.edu or to VIARC, Public Inquiry Mail Service, P.O. Box 37012, Washington, D.C. 20013.

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Rev. May 2003a
Brief Summary

ALLEGRA®
(fexofenadine hydrochloride)
Capsules and Tablets

INDICATIONS AND USAGE **Seasonal Allergic Rhinitis** ALLEGRA is indicated for the relief of symptoms associated with seasonal allergic rhinitis in adults and children 6 years of age and older. Symptoms treated effectively were sneezing, rhinorrhea, itchy nose/palate/throat, itchy/watery/red eyes. **Chronic Idiopathic Urticaria** ALLEGRA is indicated for treatment of uncomplicated skin manifestations of chronic idiopathic urticaria in adults and children 6 years of age and older. It significantly reduces pruritus and the number of wheals. **CONTRAINDICATIONS** ALLEGRA is contraindicated in patients with known hypersensitivity to any of its ingredients. **PRECAUTIONS** **Drug Interaction with Erythromycin and Ketoconazole** Fexofenadine hydrochloride has been shown to exhibit minimal (ca. 5%) metabolism. However, co-administration of fexofenadine hydrochloride with ketoconazole and erythromycin led to increased plasma levels of fexofenadine hydrochloride. Fexofenadine hydrochloride had no effect on the pharmacokinetics of erythromycin and ketoconazole. In two separate studies, fexofenadine hydrochloride 120 mg twice daily (two times the recommended twice daily dose) was co-administered with erythromycin 500 mg every 8 hours or ketoconazole 400 mg once daily under steady state conditions to normal, healthy volunteers (n=24, each study). No differences in adverse events or QT interval were observed when patients were administered fexofenadine hydrochloride alone or in combination with erythromycin or ketoconazole. The findings of these studies are summarized in the following table:

Effects on steady-state fexofenadine hydrochloride pharmacokinetics after 7 days of co-administration with fexofenadine hydrochloride 120 mg every 12 hours (two times the recommended twice daily dose) in normal volunteers (n=24)

Concomitant Drug	C_{max} *(Peak plasma concentration)*	$AUC_{0-\tau}$ *(Extent of systemic exposure)*
Erythromycin (500 mg every 8 hrs)	−82%	−103%
Ketoconazole (400 mg once daily)	+135%	−164%

The changes in plasma levels were within the range of plasma levels achieved in adequate and well-controlled clinical trials. The mechanism of these interactions has been evaluated *in vitro*, *in situ*, and *in vivo* animal models. These studies indicate that ketoconazole or erythromycin co-administration enhances fexofenadine gastrointestinal absorption. *In vivo* animal studies also suggest that in addition to increasing absorption, ketoconazole decreases fexofenadine hydrochloride gastrointestinal secretion, while erythromycin may also decrease biliary excretion. **Drug Interactions with Antacids** Administration of 120 mg of fexofenadine hydrochloride (2 x 60 mg capsules) within 15 minutes of an aluminum and magnesium containing antacid (Maalox®) decreased fexofenadine AUC by 41% and C_{max} by 43%. ALLEGRA should not be taken closely in time with aluminum and magnesium containing antacids. **Carcinogenesis, Mutagenesis, Impairment of Fertility** The carcinogenic potential and reproductive toxicity of fexofenadine hydrochloride were assessed using terfenadine studies with adequate fexofenadine hydrochloride exposure (based on plasma area-under-the-concentration-vs.-time [AUC] values). No evidence of carcinogenicity was observed in an 18-month study in mice and in a 24-month study in rats at oral doses up to 150 mg/kg of terfenadine which led to fexofenadine exposures that were respectively approximately 3 and 5 times the exposure from the maximum recommended daily oral dose of fexofenadine hydrochloride in adults and children. In *in vitro* (Bacterial Reverse Mutation, CHO-HGPRT Forward Mutation, and Rat Lymphocyte Chromosomal Aberration assays) and *in vivo* (Mouse Bone Marrow Micronucleus assay) tests, fexofenadine hydrochloride revealed no evidence of mutagenic or clastogenic activity. In rat fertility studies, dose related reductions in implants and increases in post-implantation losses were observed at an oral dose of 150 mg/kg of terfenadine which led to fexofenadine hydrochloride exposures that were approximately 3 times the exposure of the maximum recommended daily oral dose of fexofenadine hydrochloride in adults. **Pregnancy** **Teratogenic Effects: Category C.** There was no evidence of teratogenicity in rats or rabbits at oral doses of terfenadine up to 300 mg/kg which led to fexofenadine exposures that were approximately 4 and 31 times, respectively, the exposure from the maximum recommended daily oral dose of fexofenadine in adults). There are no adequate and well controlled studies in pregnant women. Fexofenadine should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. **Nonteratogenic Effects.** Dose-related decreases in pup weight gain and survival were observed in rats exposed to an oral dose of 150 mg/kg of terfenadine (approximately 3 times the maximum recommended daily oral dose of fexofenadine hydrochloride in adults based on comparison of fexofenadine hydrochloride AUCs). **Nursing Mothers** There are no adequate and well-controlled studies in women during lactation. Because many drugs are excreted in human milk, caution should be exercised when fexofenadine hydrochloride is administered to a nursing woman. **Pediatric Use** The recommended dose in patients 6 to 11 years of age is based on cross-study comparison of the pharmacokinetics of ALLEGRA in adults and pediatric patients and on the safety profile of fexofenadine hydrochloride in both adult and pediatric patients at doses equal to or higher than the recommended doses. The safety of ALLEGRA tablets at a dose of 30 mg twice daily has been demonstrated in 438 pediatric patients 6 to 11 years of age in two placebo-controlled 2-week seasonal allergic rhinitis trials. The safety of ALLEGRA for the treatment of chronic idiopathic urticaria in patients 6 to 11 years of age is based on cross-study comparison of the pharmacokinetics of ALLEGRA in adult and pediatric patients and on the safety profile of fexofenadine in both adult and pediatric patients at doses equal to or higher than the recommended dose. The effectiveness of ALLEGRA for the treatment of seasonal allergic rhinitis in patients 6 to 11 years of age was demonstrated in one trial (n=411) in which ALLEGRA tablets 30 mg twice daily significantly reduced total symptom scores compared to placebo, along with extrapolation of demonstrated efficacy in patients ages 12 years and above and the pharmacokinetic comparisons in adults and children. The effectiveness of ALLEGRA for the treatment of chronic idiopathic urticaria in patients 6 to 11 years of age is based on an extrapolation of the demonstrated efficacy of ALLEGRA in adults with this condition and the likelihood that the disease course, pathophysiology, and the drug's effect are substantially similar in children to that of adult patients. Three clinical safety studies comparing 15 mg BID (n=94) and 30 mg BID (n=330) of an experimental formulation of fexofenadine to placebo (n=433) have been conducted in pediatric patients aged 6 months to 5 years. In general, fexofenadine hydrochloride was well tolerated in these studies. No unexpected adverse events were seen given the known safety profile of fexofenadine and well-known adverse reactions for this patient population. See ADVERSE REACTIONS and CLINICAL PHARMACOLOGY. The safety and effectiveness of fexofenadine hydrochloride in pediatric patients under 6 years of age have not been established. **Geriatric Use** Clinical studies of ALLEGRA tablets and capsules did not include sufficient numbers of subjects aged 65 years and over to determine whether it is population responds differently from younger patients. Other reported clinical experience has not identified differences in responses between the geriatric and younger patients. This drug is known to be substantially excreted by the kidney, and the risk of toxic reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection, and may be useful to monitor renal function. See CLINICAL PHARMACOLOGY. **ADVERSE REACTIONS** **Seasonal Allergic Rhinitis Adults.** In placebo controlled seasonal allergic rhinitis clinical trials in patients 12 years of age and older, which included 2461 patients receiving fexofenadine hydrochloride capsules at doses of 20 mg to 240 mg twice daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. All adverse events that were reported by greater than 1% of patients who received the recommended daily dose of fexofenadine hydrochloride 60 mg capsules twice daily and that were more common with fexofenadine hydrochloride than placebo are listed in Table 1. In a placebo-controlled clinical study in the United States which included 570 patients aged 12 years and older receiving fexofenadine hydrochloride tablets at doses of 120 or 180 mg once daily, adverse events were similar in fexofenadine hydrochloride and placebo treated patients. Table 1 also lists adverse experiences that were reported by greater than 2% of patients treated with fexofenadine hydrochloride tablets at doses of 180 mg once daily and that were more common with fexofenadine hydrochloride than placebo. The incidence of adverse events, including drowsiness, was not dose-related and was similar across subgroups defined by age, gender, and race.

Table 1
Adverse experiences in patients ages 12 years and older reported in placebo-controlled seasonal allergic rhinitis clinical trials in the United States

Twice daily dosing with fexofenadine capsules at rates of greater than 1%

Adverse experience	*Fexofenadine 60 mg Twice Daily n=679*	*Placebo Twice Daily n=677*
Viral Infection (cold, flu)	2.7%	1.5%
Nausea	1.6%	1%
Dysmenorrhea	1.5%	0.9%
Drowsiness	1.3%	0.9%
Dyspepsia	1.3%	0.6%
Fatigue	1.3%	0.9%

Once daily dosing with fexofenadine hydrochloride tablets at rates of greater than 2%

Adverse experience	*Fexofenadine 180 mg once daily n=283*	*Placebo (n=293)*
Headache	10.6%	7.5%
Upper Respiratory Tract Infection	5.4%	3.1%
Back Pain	2.0%	1.4%

The frequency and magnitude of laboratory abnormalities were similar in fexofenadine hydrochloride and placebo-treated patients. **Pediatric.** Table 2 lists adverse experiences in patients aged 6 to 11 years of age which were reported by greater than 2% of patients treated with fexofenadine hydrochloride tablets at a dose of 30 mg twice daily in placebo controlled seasonal allergic rhinitis studies in the United States and Canada that were more common with fexofenadine hydrochloride than placebo.

Table 2
Adverse experiences reported in placebo-controlled seasonal allergic rhinitis studies in pediatric patients ages 6 to 11 in the United States and Canada at rates of greater than 2%

Adverse experience	*Fexofenadine 30 mg twice daily (n=209)*	*Placebo (n=229)*
Headache	7.2%	6.6%
Accidental Injury	4.3%	1.3%
Coughing	3.3%	1.3%
Fever	2.4%	0.9%
Pain	2.4%	0.4%
Otitis Media	2.4%	0.0%
Upper Respiratory Tract Infection	4.3%	1.7%

Three clinical safety studies in 845 children aged 6 months to 5 years comparing 15 mg BID (n=85) and 30 mg BID (n=322) of an experimental formulation of fexofenadine to placebo (n=436) have been conducted. In general, fexofenadine hydrochloride was well tolerated in these studies. No unexpected adverse events were seen given the known safety profile of fexofenadine and well-known adverse reactions for this patient population. (See PRECAUTIONS, Pediatric Use). **Chronic Idiopathic Urticaria** Adverse events reported by patients 12 years of age and older in placebo-controlled chronic idiopathic urticaria studies were similar to those reported in placebo-controlled seasonal allergic rhinitis studies. In placebo-controlled chronic idiopathic urticaria clinical trials, which included 726 patients 12 years of age and older receiving fexofenadine hydrochloride tablets at doses of 20 to 240 mg twice daily, adverse events were similar in fexofenadine hydrochloride and placebo treated patients. Table 3 lists adverse experiences in patients aged 12 years and older which were reported by greater than 2% of patients treated with fexofenadine hydrochloride 60 mg tablets twice daily, in controlled clinical studies in the United States and Canada and that were more common with fexofenadine hydrochloride than placebo. The safety of fexofenadine hydrochloride in the treatment of chronic idiopathic urticaria in pediatric patients 6 to 11 years of age is based on the safety profile of fexofenadine hydrochloride in adults and adolescent patients at doses equal to or higher than the recommended dose (see Pediatric Use).

Table 3
Adverse experiences reported in patients 12 years and older in placebo-controlled chronic idiopathic urticaria studies in the United States and Canada at rates of greater than 2%

Adverse experience	*Fexofenadine 60 mg twice daily n=136*	*Placebo n=173*
Back Pain	3.2%	1.1%
Sinusitis	3.2%	1.1%
Dizziness	2.9%	0.6%
Drowsiness	2.2%	0.0%

Events that have been reported during controlled clinical trials involving seasonal allergic rhinitis and chronic idiopathic urticaria patients with incidences less than 1% and similar to placebo and have been rarely reported during postmarketing surveillance include: insomnia, nervousness, and sleep disorders or paroniria. In rare cases, rash, urticaria, pruritus and hypersensitivity reactions with manifestations such as angioedema, chest tightness, dyspnea, flushing and systemic anaphylaxis have been reported. **OVERDOSAGE** Reports of fexofenadine hydrochloride overdose have been infrequent and contain limited information. However, dizziness, drowsiness, and dry mouth have been reported. Single doses of fexofenadine hydrochloride up to 800 mg (six normal volunteers at this dose level), and doses up to 690 mg twice daily for 1 month (three normal volunteers at this dose level) or 240 mg once daily for 1 year (234 normal volunteers at this dose level) were administered without the development of clinically significant adverse events as compared to placebo. In the event of overdose, consider standard measures to remove any unabsorbed drug. Symptomatic and supportive treatment is recommended. Hemodialysis did not effectively remove fexofenadine hydrochloride from blood (<1% removed) following terfenadine administration. No deaths occurred at oral doses of fexofenadine hydrochloride up to 5000 mg/kg in mice (>10 times the maximum recommended daily oral dose in adults and 200 times the maximum recommended daily oral dose in children based on mg/m²) and up to 5000 mg/kg in rats (>30 times the maximum recommended daily oral dose in adults and 400 times the maximum recommended daily oral dose in children based on mg/m²). Additional animal toxicity data: In dogs, no evidence of gross pathological findings was observed at oral doses up to 2000 mg/kg (300 times the maximum recommended daily oral dose in adults and 530 times the maximum recommended daily oral dose in children based on mg/m²). **DOSAGE AND ADMINISTRATION** **Seasonal Allergic Rhinitis Adults and Children 12 Years and Older.** The recommended dose of ALLEGRA is 60 mg twice daily or 180 mg once daily. A dose of 60 mg once daily is recommended as the starting dose in patients with decreased renal function (see CLINICAL PHARMACOLOGY). **Children 6 to 11 Years.** The recommended dose of ALLEGRA is 30 mg twice daily. A dose of 30 mg once daily is recommended as the starting dose in pediatric patients with decreased renal function (see CLINICAL PHARMACOLOGY). **Chronic Idiopathic Urticaria Adults and Children 12 Years and Older.** The recommended dose of ALLEGRA is 60 mg twice daily. A dose of 60 mg once daily is recommended as the starting dose in patients with decreased renal function (see CLINICAL PHARMACOLOGY). **Children 6 to 11 Years.** The recommended dose of ALLEGRA is 30 mg twice daily. A dose of 30 mg once daily is recommended as the starting dose in pediatric patients with decreased renal function (see CLINICAL PHARMACOLOGY).

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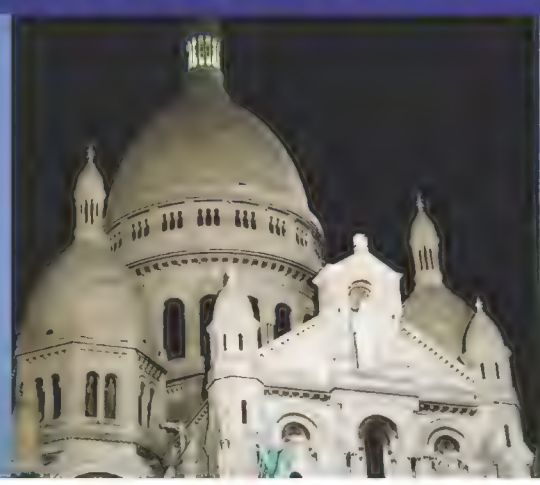

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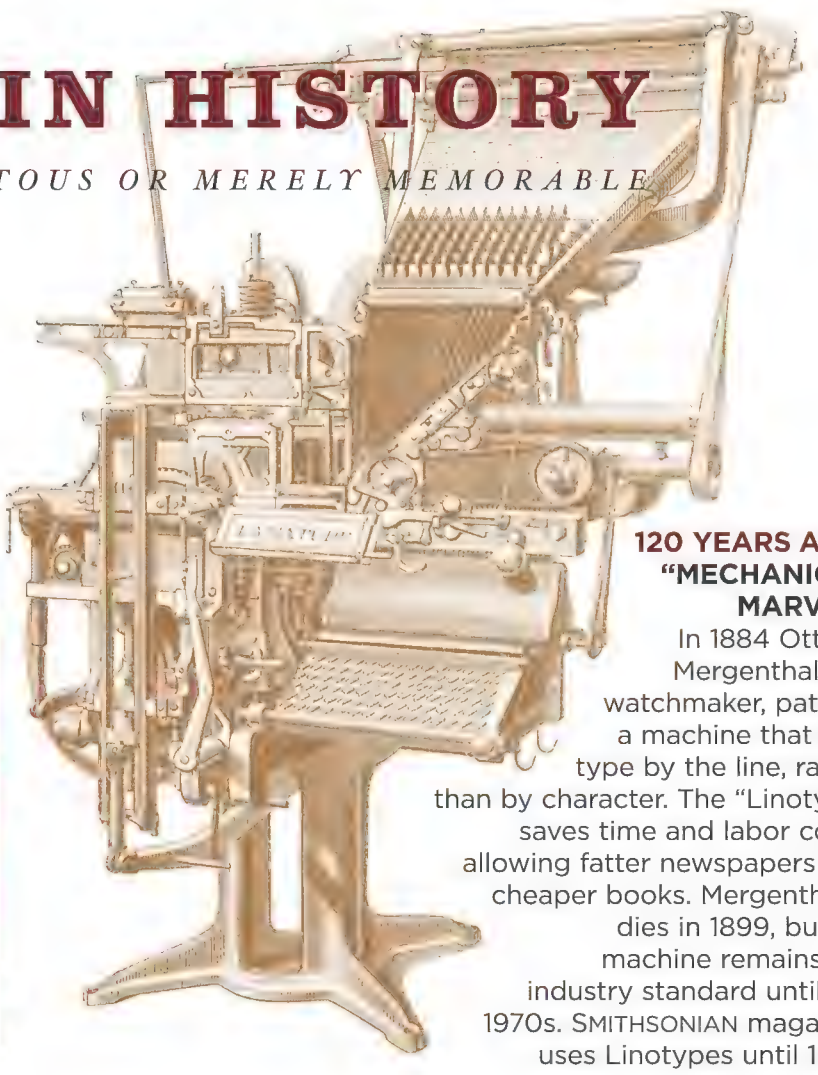
THIS MONTH IN HISTORY

AUGUST ANNIVERSARIES—MOMENTOUS OR MERELY MEMORABLE

1,925 YEARS AGO: BURIED TREASURES
The frescoed Villa of the Mysteries (below), and everything else at Pompeii, is buried under more than 19 feet of ash and debris from a two-day eruption of Mount Vesuvius, August 24-25, A.D. 79. "Darkness and ashes came . . . a great weight of them," writes witness Pliny the Younger. Thousands die. Excavations begin in 1748, revealing well-preserved houses, shrines and inscriptions that provide key evidence of Roman culture and city planning. This villa is uncovered by 1930.



120 YEARS AGO: "MECHANICAL MARVEL"
In 1884 Ottmar Mergenthaler, a watchmaker, patents a machine that sets type by the line, rather than by character. The "Linotype" saves time and labor costs, allowing fatter newspapers and cheaper books. Mergenthaler dies in 1899, but his machine remains the industry standard until the 1970s. SMITHSONIAN magazine uses Linotypes until 1988.

60 YEARS AGO: LIBÉRÉ
Just 11 weeks after the Allied landing at Normandy, Free French and American troops roll triumphantly through the streets of Paris in August 1944 after liberating the city from four years of German occupation. Greeted by Parisians who had risen up days earlier against their occupiers, American journalist Ernie Pyle reports, "We all got kissed until we were red in the face, and I must say we enjoyed it." U.S. troops reach Germany two weeks later.

30 YEARS AGO: IT'S OVER
Facing impeachment and a trial in the Senate for his Watergate misdeeds, Richard M. Nixon, 61, becomes the first U.S. president to resign, August 9, 1974. "I have always tried to do what was best for the nation," he says. Nixon dies in April 1994 at age 81.

230 YEARS AGO: PUBLISH OR PERISH
English clergyman physicist Joseph Priestly discovers oxygen on August 1, 1774. His "Dephlogisticated air," as he calls it, had also been discovered two years earlier in Sweden by Carl Wilhelm Scheele, but Priestly publishes results first and gets the credit.

80 YEARS AGO: TOMORROW'S GIRL
Little Orphan Annie makes her comic strip debut August 5, 1924. Cartoonist Harold Gray originally draws "little orphan Otto"; an editorial change makes "Annie" one of the first strips to feature a girl. Gray dies in 1968, but Annie stars in movies and on Broadway. The strip, now drawn by others, is still running.

—ALISON MCLEAN

CLOCKWISE FROM TOP LEFT: MUSEO E GALLERIE NAZIONALI DI CAPODIMONTE, NAPLES ITALY / BRIDGEMAN ART LIBRARY; BETTMANN / CORBIS; GJON MILI / TIME LIFE PICTURES / GETTY IMAGES; KEN WELSH / PRIVATE COLLECTION / BRIDGEMAN ART LIBRARY; REPRINTED WITH PERMISSION FROM TRIBUNE MEDIA SERVICES, INC.; CORBIS

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Fallen Star

When Mary Decker crashed to the ground at the Los Angeles Olympics 20 years ago this month, a young photographer was there to capture the anguish ~ BY NADIRA A. HIRA

"I was in the right place at the right time," Burnett says of his 1984 photo of Decker, who still runs (below, in 2002 at age 44).

DAVID BURNETT / CONTACT PRESS IMAGES; RONEN ZILBERMAN / AP / WIDE WORLD PHOTOS

THE CURSE OF THE SPORTS PHOTOGRAPHER has always been redundancy. Year after year, city after city, he travels in a pack, following the competitive grind in pursuit of images that rise above decorating the box scores and go on to shape our collective sports consciousness.

David Burnett's first shot at capturing that kind of history came in the 1984 Summer Olympics in Los Angeles. Mary Decker, a world-class runner and an American sweetheart in the tradition of Peggy Fleming and Chris Evert, was competing in the 3,000-meter race on the last day of the track-and-field events. No longer "Little Mary Decker," the pigtailed girl-wonder from New Jersey who'd set her first American record at age 14, she was now 26 and fresh from victories in 1,500- and 3,000-meter races at the World Championships in Helsinki the year before.

Her spitfire appeal promised to make the race a highlight of the Games 20 years ago this month. That she would win was a given. But the beauty of sports, of course, is that no conclusion is ever really foregone.

Burnett, then 37, was on assignment for *Time* magazine through Contact Press Images, the photo agency he co-founded nine years earlier. "I had been covering track and field for about a week," he recalls, "and I was surrounded by all these photographers with eight billion lenses and

"I look at it as . . . Olympic history, and it truly feels like it was another lifetime ago."

Primarily a news photographer, Burnett (below, in 2004) says he still tries to come up with "new ways to capture the miracle of sport" (a 1996 Olympics trial in Florida).

motor-drive cameras up the wazoo." Frustrated, he broke from the group assembling at the finish line in Memorial Coliseum, where the track circled a football field. "I thought, The hell with it, I'll find someplace where I don't have to fight to sit or stand. So my assistant and I wandered down the track and found a great little spot opposite the 30-yard line. The light was falling nicely in the afternoon, and it was very quiet. The funny thing is, all the photographers I knew were finding a place to be—a sun shot, or with Decker's mother for a tearful moment—to get a special picture." Then, one of the most unforgettable events of the Games happened right in front of him.

Zola Budd, an 18-year-old South African known for racing barefoot, had gained notoriety for joining the British track squad under questionable circumstances, her native country's apartheid policies having led Olympics officials to ban it from the Games. With less than three laps to go and Budd leading Decker, the two made contact, and Decker tripped, crashing to the ground. "My first thought was, 'I have to get up,'" Decker would later tell *Sports Illustrated*. "It felt like I was tied to the ground."

Tom Jordan, a track-and-field promoter, was in the coliseum stands. "I was in a state of shock," he recalls. "It was a feeling like, *Stop the race. We have to do this over again*."

Budd finished seventh in the race, in tears before the more than 85,000 fans, most of whom, it seemed, were booing. Track officials initially disqualified Budd for obstruction, then reinstated her after viewing films of the race. Her career would never quite fulfill its potential. These days, Budd lives in Bloemfontein, South Africa, where she raises a family and reportedly runs for pleasure, without the stress of competition.

The year after the Los Angeles incident, Mary Decker Slaney—she married British discus thrower Richard Slaney in January 1985—defeated Budd in a heralded rematch in London, and she would defeat Budd in their two subsequent meetings. But injuries plagued Slaney, and in 1997 she was alleged to have used a banned performance-enhancing substance. She served a two-year suspension from competition before track officials exonerated her. All told, she set 36 U.S. running records and about 17 official and unofficial world records. In 2003, she was inducted into the National Distance Running Hall of Fame.

Meanwhile, track and field, it might be said, has grown up. "The sport has become much more professional in the past two decades," says Jordan, who is meet director of the Prefontaine Classic, an annual track-and-field event in Eugene, Oregon. "The pay is better, and athletes have agents, massage therapists, psychologists, as well as coaches." Success, once measured in wins and margins, is now as much a matter of shoe endorsements and movie cameos. And yet track stars don't garner the sort of attention they once did. From 1980 to 1985, Decker graced the cover of *Sports Illustrated* four times, a number matched by just one other woman—supermodel Elle Macpherson, whose bikini'd appearances don't exactly celebrate athleticism. Track-and-field athletes have appeared on the magazine's cover 100 times in its 50-year history—but only five times in the past decade.

Slaney, who did not respond to requests to be interviewed for this story, lives in Eugene, Oregon, and continues to train. "I think '84 is probably the Olympics that I should have won, or that I could have won, I guess, had I not fallen down," she told Eugene's *Register-Guard* this past year, adding: "I look at it as history, Olympic history, and it truly feels like it was another lifetime ago."

What remains vivid in the memory of that August afternoon is Burnett's picture of a crumpled and inconsolable Decker straining toward a victory that seconds before had hovered within reach. The photograph, an instant classic, has shaped, if not replaced, our memory of the event and come to be regarded as a painfully precise representation of dreams dashed. "That was the day," Burnett says, "I really became a sports photographer."

NADIRA A. HIRA, a former staff writer for Savoy *magazine, contributes to* MTV News.

DAVID BURNETT / CONTACT PRESS IMAGES; CHARLES ARCHAMBAULT

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A Matter of Taste

Are you a supertaster? Just stick out your tongue and say "yuck" ~ BY MARY BECKMAN

Babies can learn to savor bitter bottles and trust odd tastes, Julie Mennella says.

THERE'S GOOD TASTE, and according to scientists, there's supertaste. Blue food coloring is going to tell me where I lie on the continuum. Armed with a bottle of blue dye No. 1 and a Q-tip, I paint my tongue cobalt, swish some water in my mouth and spit into the bathroom sink. In the mirror I see a smattering of pink bumps—each hiding as many as 15 taste buds apiece—against the lurid blue background. Now I'm supposed to count how many of those bumps, called fungiform papillae, appear inside a circle a quarter-inch in diameter, but I don't need to do that. Obviously, I have fewer than the 30 that would qualify me as having an extraordinary palate. I am not a supertaster. Thank goodness.

Normally, people prize highly acute senses. We brag about twenty-twenty vision or the ability to eavesdrop on whispers from across the room. But taste is not so simple: supertaste may be too much of a good thing, causing those who have it to avoid bitter compounds and find some spicy foods too hot to handle. This unusual corner of perception science has been explored by Linda Bartoshuk of Yale University, who first stumbled upon supertasting about 15 years ago while studying saccharin. While most people found the sugar substitute sweet and palatable, others sensed a bitter aftertaste. She went on to test hundreds of volunteers with a host of chemicals found in food. About one in four, she discovered, qualified as supertasters, a name she coined.

To find what made them special, Bartoshuk zeroed in on the tongue's anatomy. She found that people have different numbers of fungiform papillae, with tongue topography ranging from, say, sparse cactus-pocked deserts to lush lawns. To qualify for supertasterdom, which is a genetically inherited trait, a person has to have wall-to-wall papillae on his or her tongue and also have an ability to readily taste PROP, a bitter synthetic compound also known as 6-*n*-propylthiouracil, which is used as a thyroid medication.

As it happens, Bartoshuk is a non-taster—she's among another one in four who can't detect PROP at all—and likes it that way. "I prefer the dumb, happy life I lead," she says. "'Super' connotes superiority, but supertaste often means sensory unpleasantness." In the course of her research she has relied on volunteers and colleagues to perceive what she cannot, such as the difference in creaminess between skim and 2 percent milk. "PROP tastes like quinine," says Laurie Lucchina, a supertaster who made this discovery about ten years ago when she worked with Bartoshuk. Another person in the lab, Valerie Duffy, now at the University of Connecticut, is a medium taster. Bartoshuk routinely tested "the junk food of the month," sent to the lab through a food subscription service, on the two women. "Once she brought in a cookie that she thought was very bland. But to me, it tasted just right," recalls Lucchina.

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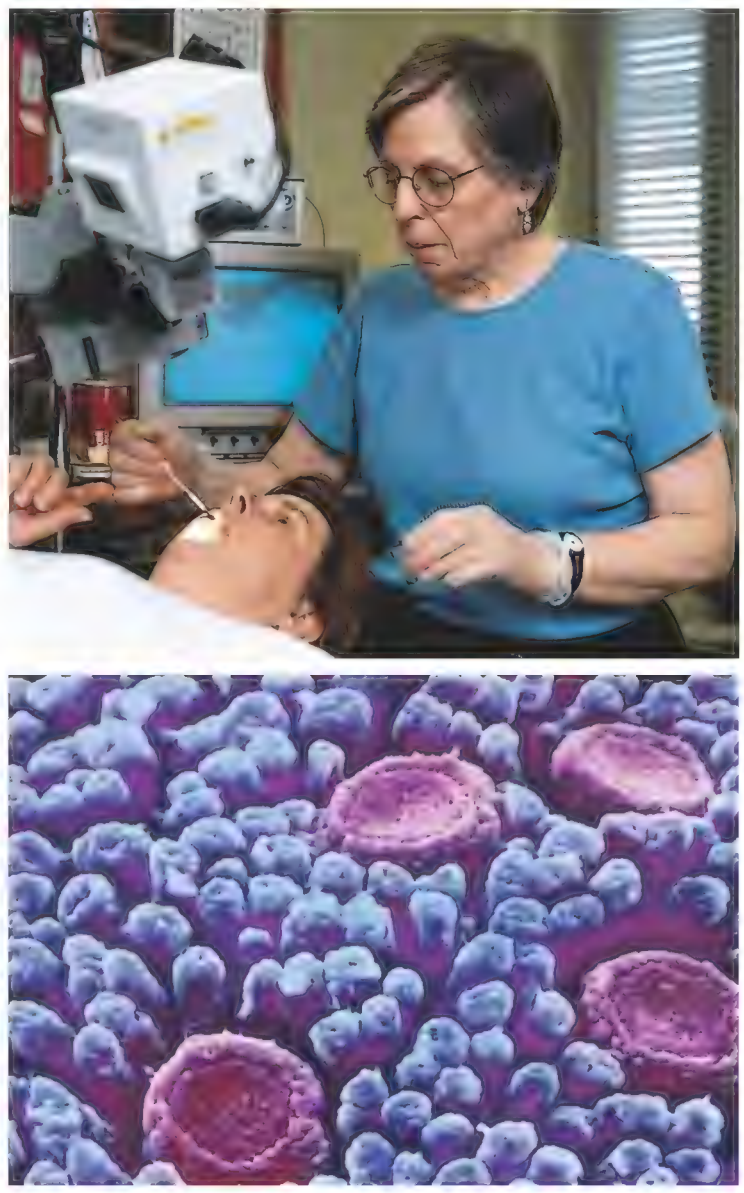
SMI8/04

"Mother's milk reflects the culture into which babies are born."

Perhaps not surprisingly, supersensitive taste influences what people eat. Bartoshuk and other researchers found that supertasters tend to shun or restrict strong-flavored foods and drinks—coffee, frosted cake, greasy barbequed ribs, hoppy hand-crafted ales. Also, supertasters tend to crave neither fats nor sugars, which probably helps explain why researchers have found that supertasters also tend to be slimmer than people without the sensitivity. When it comes to rich desserts, Lucchina says, "I usually eat just a bite or two and then I'm done."

Taste sensitivity may also affect health. According to recent studies, supertasters have better cholesterol profiles than the norm, helping reduce their risk of heart disease. Yet supertasting may also have a downside. Some scientists have speculated that supertasters don't eat enough bitter vegetables, which are believed to protect against various types of cancer. And in a still-preliminary study of 250 men by Bartoshuk and co-workers, nontasters had fewer colon polyps, a risk factor for colon cancer, than did medium tasters or supertasters. To be sure, not everyone is convinced that supertasters put themselves in harm's way by skimping on vegetables. Adam Drewnowski, a nutrition scientist at the University of Washington, says a dollop of butter or maybe a splash of cheese sauce may be all a supertaster needs to find spinach or broccoli palatable. Still, the new data intrigue medical researchers, who don't usually consider taste an inherited factor in disease risk.

Of course, there's more to satisfaction than meets the tongue. Flavors are a combination of taste and odors, which float up through the back of our mouths to activate a suite of smell receptors in the nose. (Hold your nose while tasting a jelly bean. You can tell it's sweet but not what flavor it is. Then unplug your nose. See?) Each smell tingles a different constellation of neurons in the brain, and with experience we learn what these different patterns mean—it's bacon sizzling in the kitchen, not liver. Nature may dictate whether or not we're supertasters, but it's nurture that shapes most of our food preferences.



Testing for supertasting (with Linda Bartoshuk wielding the swab) is a matter of counting the dots (fungiform papillae, pink against a blue background).

And taste training starts earlier than one might think—during breast-feeding or even in the womb, according to biopsychologist Julie Mennella of the Monell Chemical Senses Center in Philadelphia. She asked pregnant women and breast-feeding mothers to drink carrot juice for three weeks. In both cases, when it came time to switch to solid food, babies of these mothers liked carrots better than babies whose mothers never drank the stuff. "These are the first ways they learn what foods are safe," Mennella says. "Mother's milk reflects the culture into which babies are born."

Learning can even trump innate good sense, according to a study Mennella reported this past April. She found that 7-month-old babies normally disliked bitter and sour flavors, and when given a bottle with a slightly bitter, sour formula, they pushed it away and wrinkled their angelic faces in disgust. But 7-month-olds who had been introduced to the bitter formula months earlier happily drank it again. In another study of babies who'd never been fed carrots, she found that those who'd been exposed to a variety of other vegetables clearly enjoyed carrots more than did babies who'd dined on a more monotonous diet. She suggests that early exposure to a diversity of flavors enables babies to trust new foods later in life. "Clearly experience is a factor in developing food habits," says Mennella. "But we don't know how that interacts with genetics."

Beyond genes and even learning lies a more ineffable aspect of taste: its emotional content. Certain foods can bring back unpleasant experiences; it may take only one rotten hot dog to put you off franks for life. Other tastes unlock happy memories. To an extent that researchers are still trying to understand, learning which foods are safe to eat while in the security of mother's arms may be the source of some of our most enduring desires. This learning process could be, Mennella says, "one of the foundations of how we define what is a comfort food."

MARY BECKMAN, a freelance writer in Idaho, specializes in the life sciences.

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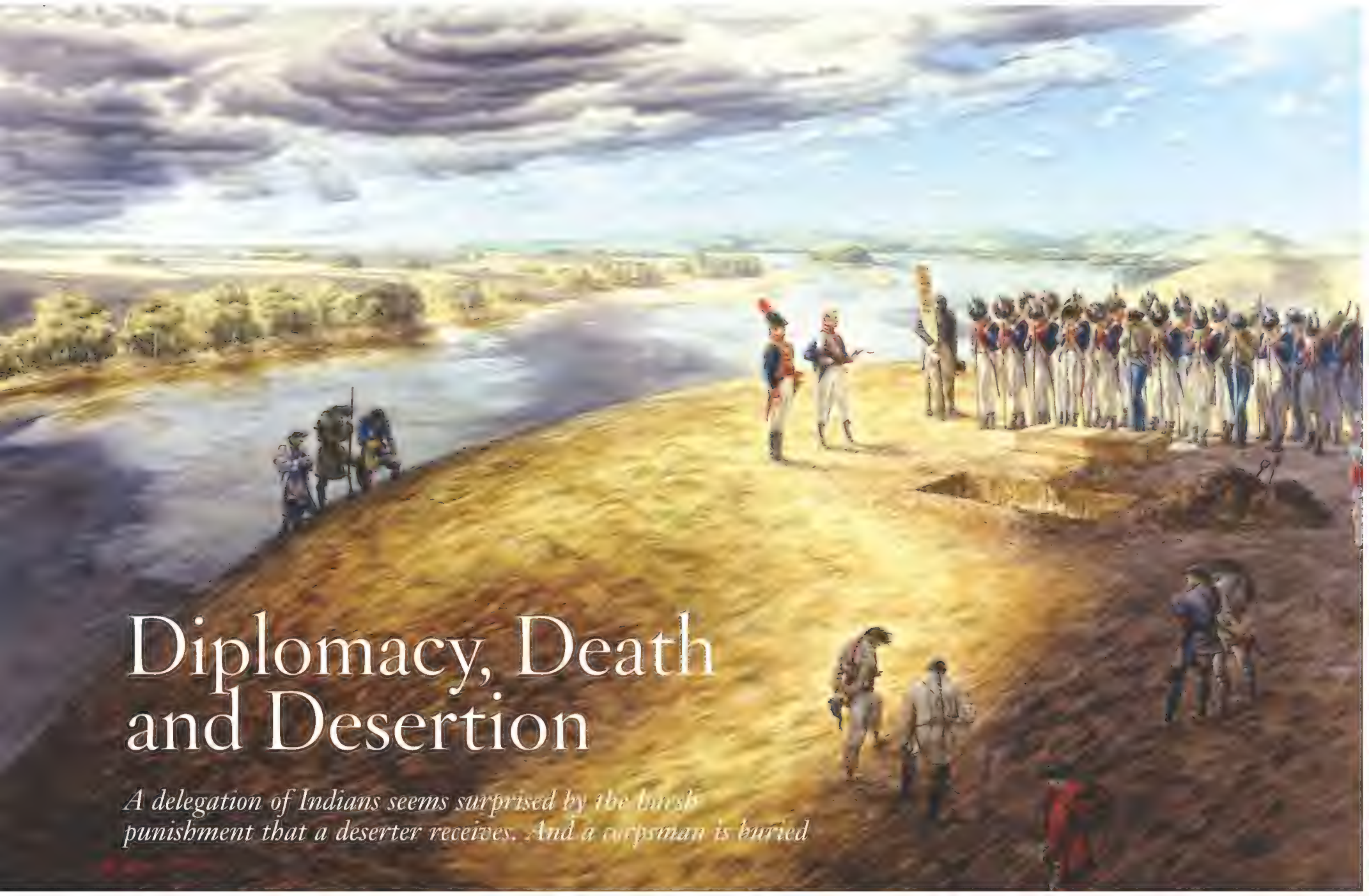

Diplomacy, Death and Desertion

A delegation of Indians seems surprised by the harsh punishment that a deserter receives. And a corpsman is buried

"We buried him with the honours of war," wrote Sergeant Ordway of the first American soldier to die west of the Mississippi.

Two hundred years ago this month, on August 3, 1804, the expedition held its first meeting with Indians—a delegation of Oto and Missouri leaders. (A second council occurred farther upriver on August 18 and 19.) In these meetings Lewis and Clark proclaimed American sovereignty, tried to promote peace between the tribes and, in exchange for trade goods and protection, asked the Otos to abandon well-established arrangements with British and French-Canadian merchants and embrace a new, untested trade network with Americans based in St. Louis.

August 1, 1804 [Capt. William Clark]
Prepared the Pipe of Peace verry flashey. . . . The Indians not yet arrived.

August 2 [Sgt. Charles Floyd]
The Indianes Came whare we had expected thay fired meney Guns when thay Came in Site of us and we ansered them withe the Cannon.

August 3 [Sgt. John Ordway]
This morning the two Captains held a Counsel With the Zottous Indians & made 6 Chiefs under the american government, they all Recd their medel & other presents With Great kindness & thankfulness they all appeared to be Glad that they had Got freed from all other powers &C—they made Some verry Sensable Speeches Smoaked and drank with us.

August 7 [Floyd]
On the 4th of this month one of ouer men by the name of Moses B. Reed went Back to ouer Camp whare we had Left in the morning, to Git his Knife which he Had Left at the Camp the Boat went on and He Did not Return, that night nor the Next day nor Night, pon examining his nap-Sack we found that he had taken his Cloas and all His powder and Balles, and had hid them out that night and had made that an excuse to Desarte from us with out aney Jest Case.

MICHAEL HAYNES

Can't wait to go to the bathroom?

DETROL LA can help control those frequent, sudden urges.

Can't get anything done without a bathroom break? You may have a medical condition called overactive bladder. You're not alone. More than 33 million people have it.[1] But there's help—DETROL LA. So ask your doctor about DETROL LA. It's easier than living with the constant interruptions.

You should not take once-daily DETROL LA if you have certain types of stomach, urinary, or glaucoma problems. DETROL LA is generally well tolerated. The most common side effect is dry mouth. Other side effects may include headache, constipation, and abdominal pain.

Do you have overactive bladder?

- I have frequent, strong, sudden urges to urinate.
- I often go more than 8 times in 24 hours, including more than twice at night.
- I'm afraid of having wetting or leaking accidents.

If any of these statements describe you, see your doctor.

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tolterodine tartrate extended release capsules

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Please see important product information on next page.

*Source: IMS Health National Prescription Audit (NPA), based on total prescriptions in August 2003.

Reference: 1. Data on file. Pfizer Inc, New York, NY.

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DETROL® LA Pharmacia&Upjohn
tolterodine tartrate extended release capsules

This summary contains important information about DETROL LA. It is not meant to take the place of discussions with your doctor and it cannot replace your doctor's advice. Only your doctor can assess the benefits and risks to decide if DETROL LA is right for you. Talk to your doctor or pharmacist or other prescribing healthcare professional if you do not understand any of this information or if you want to learn more about DETROL LA.

What are DETROL® LA Capsules used for?
DETROL LA Capsules are used to treat a condition called overactive bladder. Patients with overactive bladder have these symptoms: urinary urgency (a strong and sudden desire to urinate), frequent urinations day and night, and urge incontinence (accidental loss of urine caused by a sudden and unstoppable urge to urinate).

What is an overactive bladder?
An overactive bladder is a term for involuntary contractions of the bladder muscle (detrusor).

How does DETROL® LA work?
DETROL LA blocks contractions of the bladder muscle.

What will DETROL® LA do for me?
In a study of patients with an overactive bladder, DETROL LA reduced the number of wetting accidents and urinations, and increased the amount voided per urination compared with placebo (sugar pill).

Who should not use DETROL® LA?
DETROL LA should not be used by patients with:
• urinary retention (inability to empty the bladder)
• gastric retention (delayed emptying of the stomach)
• uncontrolled narrow-angle glaucoma
• a history of any unusual or allergic reaction to DETROL LA

What are the precautions associated with use of DETROL® LA?
DETROL LA should be used with caution by patients with any of the following conditions: significant bladder outflow blockage (slow urinary stream), because of the risk of urinary retention; gastrointestinal blockage disorders, such as pyloric stenosis (a narrowing of the opening where the stomach empties into the small intestine), because of the risk of gastric retention; narrow-angle glaucoma that is being treated; and liver or kidney disease. For patients with liver disease or kidney disease the recommended dose is 2 mg daily. Medicines like DETROL LA may cause blurred vision. See also, **"Can I take DETROL LA while taking other medicines?"** (below). It is not known whether taking DETROL LA will affect the results of laboratory tests you may undergo for other reasons.
In special studies conducted in animals and/or test tubes, the active ingredient in DETROL LA did not cause an increase in tumors, genetic changes, or changes in fertility.

Can I take DETROL® LA if I am pregnant or nursing?
DETROL LA has not been studied in pregnant women. Therefore, DETROL LA should be used during pregnancy only if the potential benefit for the mother justifies the potential risk for the unborn baby. It is not known whether the active ingredient in DETROL LA passes into human milk. Therefore, mothers who breast-feed should stop taking DETROL LA until they are no longer nursing.

Can DETROL® LA be used by children?
DETROL LA has not been studied in children.

Can DETROL® LA be used by elderly patients?
No differences were seen in safety between older and younger patients taking DETROL LA in clinical studies.

Can I take DETROL® LA while taking other medicines?
As with all prescription medicines, before you take DETROL LA, it is important for your healthcare professional to know if you are taking any other medicines. Be sure to mention those that you can buy without a prescription, especially cough/cold medicines, which may also affect urination. For patients taking certain medicines (like erythromycin, Biaxin* [clarithromycin], Sporanox* [itraconazole], Nizoral* [ketoconazole], Neoral* and Sandimmune* [cyclosporine], Velban* [vinblastine], and miconazole), the recommended dose of DETROL LA is 2 mg daily.

What are the most common side effects of DETROL® LA?
Dry mouth was the most common side effect during 12 weeks of treatment with DETROL LA (reported by 23% of those taking 2 mg daily compared with 8% of those taking a placebo [sugar pill]). Other common side effects related to DETROL LA were headache, constipation, and abdominal pain

What other side effects have been reported?
The following events were reported by at least 1% of patients treated with DETROL LA for 12 weeks but may or may not have been caused by DETROL LA: fatigue, dizziness, dyspepsia (indigestion), xerophthalmia (dry eyes), abnormal vision, somnolence (sleepiness), anxiety, sinusitis, and dysuria (painful urination).

How should I take DETROL® LA?
The recommended dose of DETROL LA is 4 mg daily. DETROL LA should be taken once daily with liquids and swallowed whole. The dose may be lowered to 2 mg daily, if needed. For patients with liver or kidney disease and those taking certain medicines (like erythromycin, Biaxin®, Sporanox®, Nizoral®, Neoral®, Sandimmune®, Velban®, and miconazole), the recommended dose of DETROL LA is 2 mg daily.

Rx only.
US Patent No. 5,382,600

Manufactured for:
Pharmacia & Upjohn Company
Kalamazoo, MI 49001, USA

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CB-1-S

August 7 [Clark]
At 1 oClock dispatched George Drewyer, R. Fields, Wm. Bratten & Wm. Labieche back after the Deserter reid with order if he did not give up Peaceibly to put him to Death.

August 17 [Clark]
At 6 oClock this evening [I was informed] that the Party was behind with one of the Deserters M B. Reed and the 3 principal Chiefs of the Nations.

August 18 [Clark]
The Party with the Indians arrivd. we meet them under a Shade near the Boat and after a Short talk we gave them Provisions to eat & proceeded to the [trial] of Reed.

August 18 [Pvt. Joseph Whitehouse]
[The Indians] came in Order, to holde a council & have a treaty with Captain Lewis & Captain Clarke, and to make a lasting peace with them, in behalf of the United States. In the Evening M Read was tried by Court Marshall, and sentenc'd to be punishe'd by whipping him. The Indians were all concerned at seeing Read receive his punishment, and seemed truly sorry.

August 18 [Clark]
The three principal Chiefs petitioned for Pardin for this man After we explained the injurey Such men could doe them by false representation, & explang. the Customs of our Countrey they were all Satisfied with the propriety of the Sentence & was witness to the punishment [of 500 lashes].

August 19 [Clark]
Sergt. Floyd was taken violently bad with the Beliose Cholick and is dangerously ill we attempt in Vain to releive him, I am much concerned for his Situation—we could get nothing to Stay on his Stomach a moment nature appear exosting fast.

August 20 [Clark]
I am Dull & heavy been up the greater Part of last night with Serjt. Floyd, who is a[s] bad as he can be to live. . . . we Came to make a warm bath for Sergt. Floyd hopeing it would brace him a little, before we could get him in to this bath he expired, with a great deel of composure, haveing Said to me before his death that he was going away and wished me to write a letter. . . . This Man at all times gave us proofs of his firmness and Deturmined resolution to doe Service to his Countrey and honor to himself after paying all the honor to our Decesed brother we Camped in the mouth of *floyds* river about 30 yards wide, a butifull evening.

William Clark considered Charles Floyd (the sergeant's memorial overlooks Sioux City, Iowa) "a man of much merit."

August 26 [Capt. Meriwether Lewis]
The commanding officers have thought it proper to appoint Patric Gass, a Sergeant in *the corps of volunteers for North Western Discovery*, he is therefore to be obeyed and respected accordingly.

Medical historians believe that Sergeant Floyd most likely suffered a ruptured appendix and died from the resulting peritonitis. At the end of the expedition, Meriwether Lewis successfully petitioned Henry Dearborn, secretary of war, to posthumously award Floyd land, which was deeded to his brother and two sisters.

TIM THOMPSON / CORBIS

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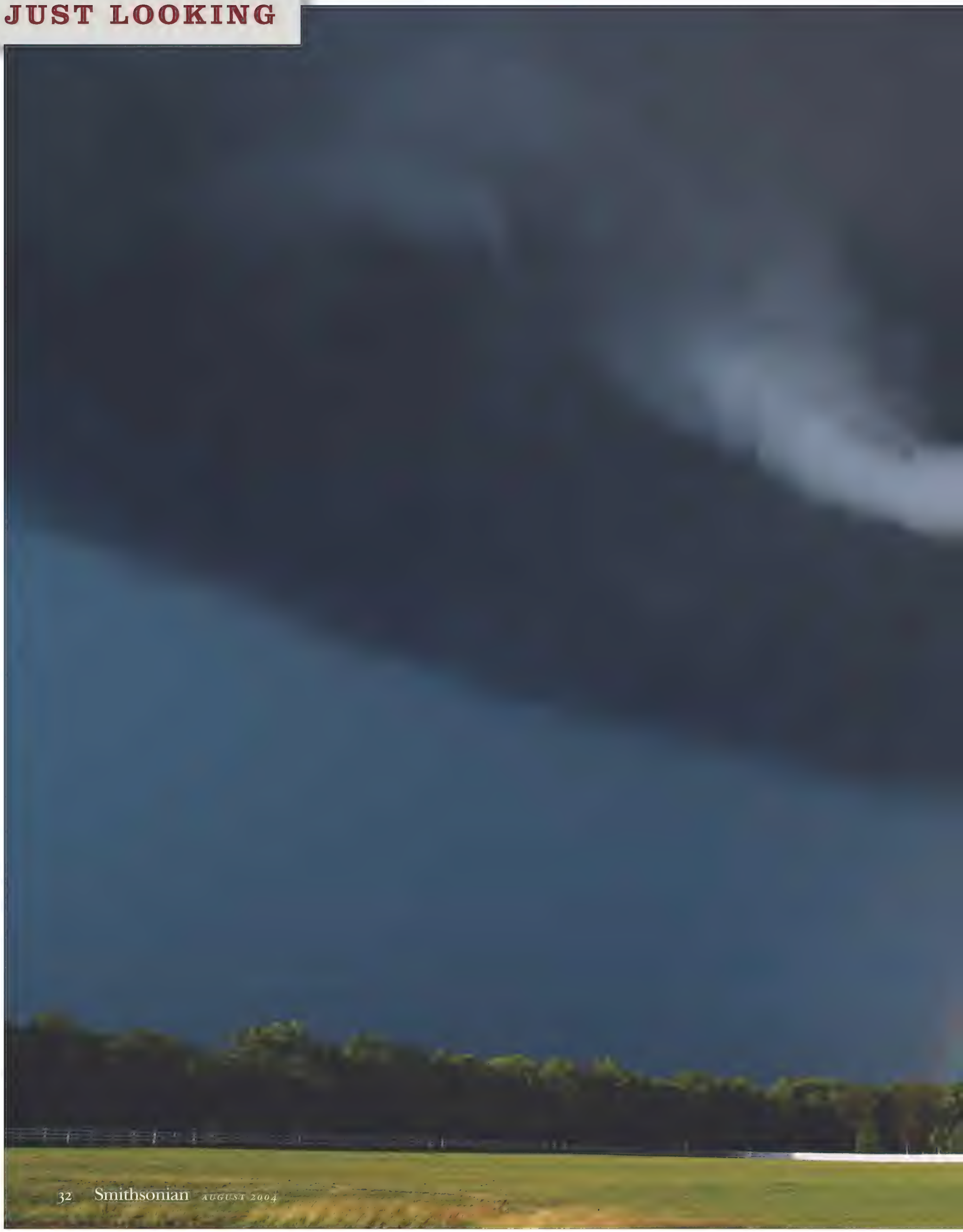

BRUTAL MERCIES A Greek Revival farmhouse was spared while others behind it were swept away, as the "most beautiful tornado" photographer Eric Michael Nguyen says he has ever seen touched down near Mulvane, south of Wichita, Kansas, in June. The quarter-mile-wide twister, swirling at nearly 200 miles per hour, threw a 1969 Ford Mustang some 270 yards. It "formed above my house and dropped on us from above," says Mulvane resident Chris Landis, 39, an office worker. Landis, along with her son, Mitchel, 13, took shelter under a basement stairway while their house was reduced to rubble above them. Sunlight, refracted by falling hail the size of baseballs, created the rainbow. *—HELEN STARKWEATHER*

Token of Appreciation

A grateful Pomo Indian's gift to a friend exemplifies the highest form of Native American artistry ~ BY ED LEIBOWITZ

[*Pomo Indian basket* HEYE CENTER / SMITHSONIAN MUSEUM OF THE AMERICAN INDIAN IN NEW YORK]

IN THE EARLY 1900S, William and Mary Benson, a Pomo Indian couple, won renown for their exquisite Native American baskets. In 1912, they gave one of William's most masterly pieces to a trusted friend. It is now among 200 artifacts in "The Language of Native American Baskets" exhibit at the Smithsonian's Heye Center at the Museum of the American Indian in New York City (through January 2005).

The Bensons, who spent most of their lives on Pomo tribal territories near what is now Ukiah, California, met Grace Nicholson, a Pasadena dealer in Native American basketry, in 1903; she soon signed the couple to an exclusive contract. The market was heating up as a first wave of collectors began

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"You alwis are to have the first chance of our baskets. There is no danger of any . . . going out of our hands without you knowing."

"This basket was the first I made," William Benson (and Mary, c. 1903) wrote to Nicholson, though some experts insist it's too sophisticated to be an early work.

vying to purchase outstanding examples of Native American craft.

Mary Benson was diagnosed with corneal disease in December 1911. Without treatment, she would have grown completely blind. Nicholson paid for the surgery that restored her sight. Generosity was Nicholson's hallmark, says Jeanne Perkins, a Pasadena-based writer who is working on a biography of the dealer. "She never said, 'I'll give you this much money,'" Perkins says. "She always said to the weaver, 'How much do you want for that piece?' And whatever they wanted, she paid."

In 1912, as Mary recovered, she wrote to her friend and benefactor: "[May the] Bank of Happiness Deliver to Miss Grace Nicholson Three Hundred and Sixty Five Days of Health, Wealth and Prosperity." William wrote to Nicholson as well, promising her that "you alwis [sic] are to have the first chance of our baskets. There is no danger of any baskets going out of our hands without you knowing."

The following year, William sent Nicholson a token of his appreciation: a bent-willow vessel, only about three inches high and incorporating thousands of intricate stitches. The basket is perfect in its artistry. Diagonal twining traverses three warps (vertical components). Black cotton thread and shreds of dark blue and red silk, painstakingly plucked from a handkerchief, are seamlessly woven into a matrix of cured sedge root in two hues—a natural shade of taupe and a vegetable-dyed brown. "I builted [sic] the basket in the spring of 1882," Benson wrote his friend Nicholson. "I was a little over five weeks making the basket. This basket was the first I made."

Nicholson (c. 1903) believed Benson. He made it, she wrote, "to hold his charms."

After Nicholson's death in 1948, her private collection, which included Benson's gift, was donated to the Gustave Heye Foundation—later to be incorporated into the Smithsonian's Museum of the American Indian. Today, Bruce Bernstein, who is the organizing curator of the Heye Center exhibition, believes that the basket is too sophisticated to represent Benson's first effort. "The stitches are so even in size, and it is so evenly shaped," he says. "The materials—willow for the warp, sedge and bulrush root, silk thread, all of different diameters, with variations in flexibility and tension"—suggest the work of a master.

But Nicholson herself, one of the foremost experts on Pomo basketry, took Benson at his word. "This basket [was] made by William when he was a boy to hold his charms," she wrote. "He presented this to me after a successful operation on his wife's eyes."

Perhaps the greatest collection of Pomo baskets is at the Grace Hudson Museum in Ukiah, California. Today, about 20 subgroups within the federally recognized sovereign Pomo peoples remain in the general vicinity of their ancestral lands. The museum's director, Sherrie Smith-Ferri, a leading Pomo scholar, is staying neutral on the question of when Benson may have made the basket.

"I don't know if there's any definitive way to make this judgment," Smith-Ferri says. "Bill Benson was a totally phenomenal talent—he was so good that perhaps the ordinary rules don't apply to him."

ED LEIBOWITZ is a freelance writer who is based in Los Angeles, California.

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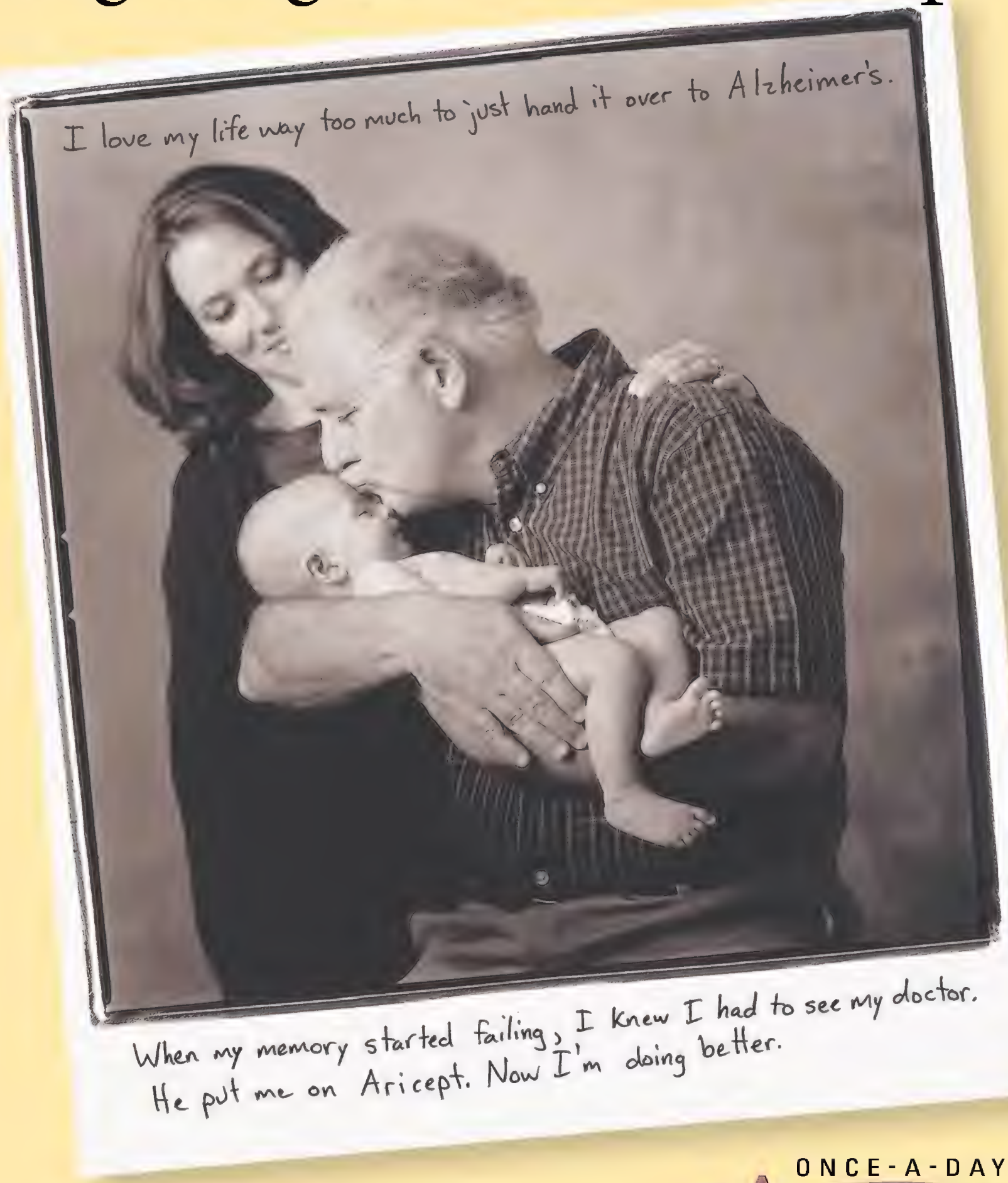
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(donepezil HCl)
5-MG AND 10-MG TABLETS

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ARICEPT® is indicated for mild to moderate Alzheimer's. It is well tolerated but may not be for everyone. Some people may experience nausea, diarrhea, not sleeping well, vomiting, muscle cramps, feeling very tired, or not wanting to eat. In studies, these side effects were usually mild and went away over time. Some people taking ARICEPT® may experience fainting.

Please see additional important product information on accompanying page.

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STRENGTH IN THE FACE OF ALZHEIMER'S™

ARICEPT® (Donepezil Hydrochloride Tablets)

Brief Summary—see package insert for full prescribing information. **INDICATIONS AND USAGE** ARICEPT® is indicated for the treatment of mild to moderate dementia of the Alzheimer's type. **CONTRAINDICATIONS** ARICEPT® is contraindicated in patients with known hypersensitivity to donepezil hydrochloride or to piperidine derivatives. **WARNINGS** ***Anesthesia:*** ARICEPT®, as a cholinesterase inhibitor, is likely to exaggerate succinylcholine-type muscle relaxation during anesthesia. ***Cardiovascular Conditions:*** Because of their pharmacological action, cholinesterase inhibitors may have vagotonic effects on the sinoatrial and atrioventricular nodes. This effect may manifest as bradycardia or heart block in patients both with and without known underlying cardiac conduction abnormalities. Syncopal episodes have been reported in association with the use of ARICEPT®. ***Gastrointestinal Conditions:*** Through their primary action, cholinesterase inhibitors may be expected to increase gastric acid secretion due to increased cholinergic activity. Therefore, patients should be monitored closely for symptoms of active or occult gastrointestinal bleeding, especially those at increased risk for developing ulcers, e.g., those with a history of ulcer disease or those receiving concurrent nonsteroidal anti-inflammatory drugs (NSAIDS). Clinical studies of ARICEPT® have shown no increase, relative to placebo, in the incidence of either peptic ulcer disease or gastrointestinal bleeding. ARICEPT®, as a predictable consequence of its pharmacological properties, has been shown to produce diarrhea, nausea and vomiting. These effects, when they occur, appear more frequently with the 10 mg/day dose than with the 5 mg/day dose. In most cases, these effects have been mild and transient, sometimes lasting one to three weeks, and have resolved during continued use of ARICEPT®. ***Genitourinary:*** Although not observed in clinical trials of ARICEPT®, cholinomimetics may cause bladder outflow obstruction. ***Neurological Conditions:*** Seizures: Cholinomimetics are believed to have some potential to cause generalized convulsions. However, seizure activity also may be a manifestation of Alzheimer's Disease. ***Pulmonary Conditions:*** Because of their cholinomimetic actions, cholinesterase inhibitors should be prescribed with care to patients with a history of asthma or obstructive pulmonary disease. **PRECAUTIONS Drug-Drug Interactions** ***Drugs Highly Bound to Plasma Proteins:*** Drug displacement studies have been performed *in vitro* between this highly bound drug (96%) and other drugs such as furosemide, digoxin, and warfarin. ARICEPT® at concentrations of 0.3–10 µg/mL did not affect the binding of furosemide (5 µg/mL), digoxin (2 ng/mL), and warfarin (3 µg/mL) to human albumin. Similarly, the binding of ARICEPT® to human albumin was not affected by furosemide, digoxin, and warfarin. ***Effect of ARICEPT® on the Metabolism of Other Drugs:*** No *in vivo* clinical trials have investigated the effect of ARICEPT® on the clearance of drugs metabolized by CYP 3A4 (e.g. cisapride, terfenadine) or by CYP 2D6 (e.g. imipramine). However, *in vitro* studies show a low rate of binding to these enzymes (mean K_i about 50–130 µM), that, given the therapeutic plasma concentrations of donepezil (164 nM), indicates little likelihood of interference. Whether ARICEPT® has any potential for enzyme induction is not known. ***Effect of Other Drugs on the Metabolism of ARICEPT®:*** Ketoconazole and quinidine, inhibitors of CYP450, 3A4 and 2D6, respectively, inhibit donepezil metabolism *in vitro*. Whether there is a clinical effect of these inhibitors is not known. Inducers of CYP 2D6 and CYP 3A4 (e.g., phenytoin, carbamazepine, dexamethasone, rifampin, and phenobarbital) could increase the rate of elimination of ARICEPT®. ***Use with Anticholinergics:*** Because of their mechanism of action, cholinesterase inhibitors have the potential to interfere with the activity of anticholinergic medications. ***Use with Cholinomimetics and Other Cholinesterase Inhibitors:*** A synergistic effect may be expected when cholinesterase inhibitors are given concurrently with succinylcholine, similar neuromuscular blocking agents or cholinergic agonists such as bethanechol. **Carcinogenesis, Mutagenesis, Impairment of Fertility** Carcinogenicity studies of donepezil have not been completed. Donepezil was not mutagenic in the Ames reverse mutation assay in bacteria. In the chromosome aberration test in cultures of Chinese hamster lung (CHL) cells, some clastogenic effects were observed. Donepezil was not clastogenic in the *in vivo* mouse micronucleus test. Donepezil had no effect on fertility in rats at doses up to 10 mg/kg/day (approximately 8 times the maximum recommended human dose on a mg/m² basis). **Pregnancy** ***Pregnancy Category C:*** Teratology studies conducted in pregnant rats at doses up to 16 mg/kg/day (approximately 13 times the maximum recommended human dose on a mg/m² basis) and in pregnant rabbits at doses up to 10 mg/kg/day (approximately 16 times the maximum recommended human dose on a mg/m² basis) did not disclose any evidence for a teratogenic potential of donepezil. However, in a study in which pregnant rats were given up to 10 mg/kg/day (approximately 6 times the maximum recommended human dose on a mg/m² basis) from day 17 of gestation through day 20 postpartum, there was a slight increase in still births and a slight decrease in pup survival through day 4 postpartum at this dose, the next lower dose tested was 3 mg/kg/day. There are no adequate or well-controlled studies in pregnant women. ARICEPT® should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. **Nursing Mothers** It is not known whether donepezil is excreted in human breast milk. ARICEPT® has no indication for use in nursing mothers. **Pediatric Use** There are no adequate and well-controlled trials to document the safety and efficacy of ARICEPT® in any illness occurring in children. **ADVERSE REACTIONS Adverse Events Leading to Discontinuation** The rates of discontinuation from controlled clinical trials of ARICEPT® due to adverse events for the ARICEPT® 5 mg/day treatment groups were comparable to those of placebo treatment groups at approximately 5%. The rate of discontinuation of patients who received 7-day escalations from 5 mg/day to 10 mg/day, was higher at 13%. The most common adverse events leading to discontinuation, defined as those occurring in at least 2% of patients and at twice the incidence seen in placebo patients, are shown in Table 1.

Table 1. Most Frequent Adverse Events Leading to Withdrawal from Controlled Clinical Trials by Dose Group

Dose Group	Placebo	5 mg/day ARICEPT®	10 mg/day ARICEPT®
Patients Randomized Event/%Discontinuing	355	350	315
Nausea	1%	1%	3%
Diarrhea	0%	<1%	3%
Vomiting	<1%	<1%	2%

Most Frequent Adverse Clinical Events Seen in Association with the Use of ARICEPT® The most common adverse events, defined as those occurring at a frequency of at least 5% in patients receiving 10 mg/day and twice the placebo rate, are largely predicted by ARICEPT®'s cholinomimetic effects. These include nausea, diarrhea, insomnia, vomiting, muscle cramp, fatigue and anorexia. These adverse events were often of mild intensity and transient, resolving during continued ARICEPT® treatment without the need for dose modification. There is evidence to suggest that the frequency of these common adverse events may be affected by the rate of titration. An open-label study was conducted with 269 patients who received placebo in the 15- and 30-week studies. These patients were titrated to a dose of 10 mg/day over a 6-week period. The rates of common adverse events were lower than those seen in patients titrated to 10 mg/day over one week in the controlled clinical trials and were comparable to those seen in patients on 5 mg/day. See Table 2 for a comparison of the most common adverse events following one and six week titration regimens.

Table 2. Comparison of Rates of Adverse Events in Patients Titrated to 10 mg/day Over 1 and 6 Weeks

	No titration		One-week titration	Six-week titration
Adverse Event	**Placebo (n=315)**	**5 mg/day (n=311)**	**10 mg/day (n=315)**	**10 mg/day (n=269)**
Nausea	6%	5%	19%	6%
Diarrhea	5%	8%	15%	9%
Insomnia	6%	6%	14%	6%
Fatigue	3%	4%	8%	3%
Vomiting	3%	3%	8%	5%
Muscle cramps	2%	6%	8%	3%
Anorexia	2%	3%	7%	3%

Adverse Events Reported in Controlled Trials The events cited reflect experience gained under closely monitored conditions of clinical trials in a highly selected patient population. In actual clinical practice or in other clinical trials, these frequency estimates may not apply, as the conditions of use, reporting behavior, and the kinds of patients treated may differ. Table 3 lists treatment emergent signs and symptoms that were reported in at least 2% of patients in placebo-controlled trials who received ARICEPT® and for which the rate of occurrence was greater for ARICEPT® assigned than placebo assigned patients. In general, adverse events occurred more frequently in female patients and with advancing age.

Table 3. Adverse Events Reported in Controlled Clinical Trials in at Least 2% of Patients Receiving ARICEPT® (donepezil HCl) and at a Higher Frequency than Placebo-treated Patients

Body System/Adverse Event	Placebo (n=355)	ARICEPT® (n=747)
Percent of Patients with any Adverse Event	**72**	**74**
Body as a Whole		
Headache	9	10
Pain, various locations	8	9
Accident	6	7
Fatigue	3	5
Cardiovascular System		
Syncope	1	2
Digestive System		
Nausea	6	11
Diarrhea	5	10
Vomiting	3	5
Anorexia	2	4
Hemic and Lymphatic System		
Ecchymosis	3	4
Metabolic and Nutritional Systems		
Weight Decrease	1	3
Musculoskeletal System		
Muscle Cramps	2	6
Arthritis	1	2
Nervous System		
Insomnia	6	9
Dizziness	6	8
Depression	<1	3
Abnormal Dreams	0	3
Somnolence	<1	2
Urogenital System		
Frequent Urination	1	2

Other Adverse Events Observed During Clinical Trials ARICEPT® has been administered to over 1700 individuals during clinical trials worldwide. Approximately 1200 of these patients have been treated for at least 3 months and more than 1000 patients have been treated for at least 6 months. Controlled and uncontrolled trials in the United States included approximately 900 patients. In regards to the highest dose of 10 mg/day, this population includes 650 patients treated for 3 months, 475 patients treated for 6 months and 116 patients treated for over 1 year. The range of patient exposures is from 1 to 1214 days. Treatment emergent signs and symptoms that occurred during 3 controlled clinical trials and two open-label trials in the United States were recorded as adverse events by the clinical investigators using terminology of their own choosing. To provide an overall estimate of the proportion of individuals having similar types of events, the events were grouped into a smaller number of standardized categories using a modified COSTART dictionary and event frequencies were calculated across all studies. These categories are used in the listing below. The frequencies represent the proportion of 900 patients from these trials who experienced that event while receiving ARICEPT®. All adverse events occurring at least twice are included, except for those already listed in Tables 2 or 3, COSTART terms too general to be informative, or events less likely to be drug caused. Events are classified by body system and listed using the following definitions: *frequent adverse events*—those occurring in at least 1/100 patients; *infrequent adverse events*—those occurring in 1/100 to 1/1000 patients. These adverse events are not necessarily related to ARICEPT® treatment and in most cases were observed at a similar frequency in placebo-treated patients in the controlled studies. No important additional adverse events were seen in studies conducted outside the United States. **Body as a Whole:** *Frequent:* influenza, chest pain, toothache; *Infrequent:* fever, edema face, periorbital edema, hernia hiatal, abscess, cellulitis, chills, generalized coldness, head fullness, listlessness. **Cardiovascular System:** *Frequent:* hypertension, vasodilation, atrial fibrillation, hot flashes, hypotension; *Infrequent:* angina pectoris, postural hypotension, myocardial infarction, AV block (first degree), congestive heart failure, arteritis, bradycardia, peripheral vascular disease, supraventricular tachycardia, deep vein thrombosis. **Digestive System:** *Frequent:* fecal incontinence, gastrointestinal bleeding, bloating, epigastric pain; *Infrequent:* eructation, gingivitis, increased appetite, flatulence, periodontal abscess, cholelithiasis, diverticulitis, drooling, dry mouth, fever sore, gastritis, irritable colon, tongue edema, epigastric distress, gastroenteritis, increased transaminases, hemorrhoids, ileus, increased thirst, jaundice, melena, polydipsia, duodenal ulcer, stomach ulcer. **Endocrine System:** *Infrequent:* diabetes mellitus, goiter. **Hemic and Lymphatic System:** *Infrequent:* anemia, thrombocythemia, thrombocytopenia, eosinophilia, erythrocytopenia. **Metabolic and Nutritional Disorders:** *Frequent:* dehydration; *Infrequent:* gout, hypokalemia, increased creatine kinase, hyperglycemia, weight increase, increased lactate dehydrogenase. **Musculoskeletal System:** *Frequent:* bone fracture; *Infrequent:* muscle weakness, muscle fasciculation. **Nervous System:** *Frequent:* delusions, tremor, irritability, paresthesia, aggression, vertigo, ataxia, increased libido, restlessness, abnormal crying, nervousness, aphasia; *Infrequent:* cerebrovascular accident, intracranial hemorrhage, transient ischemic attack, emotional lability, neuralgia, coldness (localized), muscle spasm, dysphoria, gait abnormality, hypertonia, hypokinesia, neurodermatitis, numbness (localized), paranoia, dysarthria, dyspnasia, hostility, decreased libido, melancholia, emotional withdrawal, nystagmus, pacing. **Respiratory System:** *Frequent:* dyspnea, sore throat, bronchitis; *Infrequent:* epistaxis, postnasal drip, pneumonia, hyperventilation, pulmonary congestion, wheezing, hypoxia, pharyngitis, pleurisy, pulmonary collapse, sleep apnea, snoring. **Skin and Appendages:** *Frequent:* pruritus, diaphoresis, urticaria; *Infrequent:* dermatitis, erythema, skin discoloration, hyperkeratosis, alopecia, fungal dermatitis, herpes zoster, hirsutism, skin striae, night sweats, skin ulcer. **Special Senses:** *Frequent:* cataract, eye irritation, vision blurred; *Infrequent:* dry eyes, glaucoma, earache, tinnitus, blepharitis, decreased hearing, retinal hemorrhage, otitis externa, otitis media, bad taste, conjunctival hemorrhage, ear buzzing, motion sickness, spots before eyes. **Urogenital System:** *Frequent:* urinary incontinence, nocturia; *Infrequent:* dysuria, hematuria, urinary urgency, metrorrhagia, cystitis, enuresis, prostate hypertrophy, pyelonephritis, inability to empty bladder, breast fibroadenosis, fibrocystic breast, mastitis, pyuria, renal failure, vaginitis. **Postintroduction Reports** Voluntary reports of adverse events temporally associated with ARICEPT® that have been received since market introduction that are not listed above, and that there is inadequate data to determine the causal relationship with the drug include the following: abdominal pain, agitation, cholecystitis, confusion, convulsions, hallucinations, heart block (all types), hemolytic anemia, hepatitis, hyponatremia, neuroleptic malignant syndrome, pancreatitis and rash. **OVERDOSAGE Because strategies for the management of overdose are continually evolving, it is advisable to contact a Poison Control Center to determine the latest recommendations for the management of an overdose of any drug.** As in any case of overdose, general supportive measures should be utilized. Overdosage with cholinesterase inhibitors can result in cholinergic crisis characterized by severe nausea, vomiting, salivation, sweating, bradycardia, hypotension, respiratory depression, collapse and convulsions. Increasing muscle weakness is a possibility and may result in death if respiratory muscles are involved. Tertiary anticholinergics such as atropine may be used as an antidote for ARICEPT® overdosage. Intravenous atropine sulfate titrated to effect is recommended: an initial dose of 1.0 to 2.0 mg IV with subsequent doses based upon clinical response. Atypical responses in blood pressure and heart rate have been reported with other cholinomimetics when co-administered with quaternary anticholinergics such as glycopyrrolate. It is not known whether ARICEPT® and/or its metabolites can be removed by dialysis (hemodialysis, peritoneal dialysis, or hemofiltration). Dose related signs of toxicity in animals included reduced spontaneous movement, prone position, staggering gait, lacrimation, clonic convulsions, depressed respiration, salivation, miosis, tremors, fasciculation and lower body surface temperature. **DOSAGE AND ADMINISTRATION** The dosages of ARICEPT® shown to be effective in controlled clinical trials are 5 mg and 10 mg administered once per day. The higher dose of 10 mg did not provide a statistically significantly greater clinical benefit than 5 mg. There is a suggestion, however, based upon order of group mean scores and dose trend analyses of data from these clinical trials, that a daily dose of 10 mg of ARICEPT® might provide additional benefit for some patients. Accordingly, whether or not to employ a dose of 10 mg is a matter of prescriber and patient preference. Evidence from the controlled trials indicates that the 10 mg dose, with a one week titration, is likely to be associated with a higher incidence of cholinergic adverse events than the 5 mg dose. In open label trials using a 6 week titration, the frequency of these same adverse events was similar between the 5 mg and 10 mg dose groups. Therefore, because steady state is not achieved for 15 days and because the incidence of untoward effects may be influenced by the rate of dose escalation, treatment with a dose of 10 mg should not be contemplated until patients have been on a daily dose of 5 mg for 4 to 6 weeks. ARICEPT® should be taken in the evening, just prior to retiring, and may be taken with or without food.

Eisai Inc. Teaneck, NJ 07666 · Pfizer U.S. Pharmaceuticals New York, NY 10017 · 200177 · Revised December 2000

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It's a Bird! It's a Plane! It's a . . . Flying Pancake?

A group of Texas retirees is restoring one of the oddest aircraft ever to fly

JACK BROUSE says it's like "opening up King Tut's tomb." Sitting beneath the only V-173 "Flying Pancake" ever built, Brouse pulls open the hatch of the World War II-era aircraft to reveal an engine that may not have seen the light of day in more than half a century. The smell of oil wafts from the compartment, and Brouse is almost giddy as he pokes a flashlight inside. "That engine is perfectly clean!" he says.

"You're not going to have any problem with that rascal," says a colleague looking over his shoulder.

Brouse, 81, is a retired engineer who worked for about ten years for Vought Aircraft Industries, which built the V-173 in 1941. At the Vought plant in Dallas, he and a team of 22 other company veterans are restoring the experimental aircraft for the Smithsonian's National Air and Space Museum.

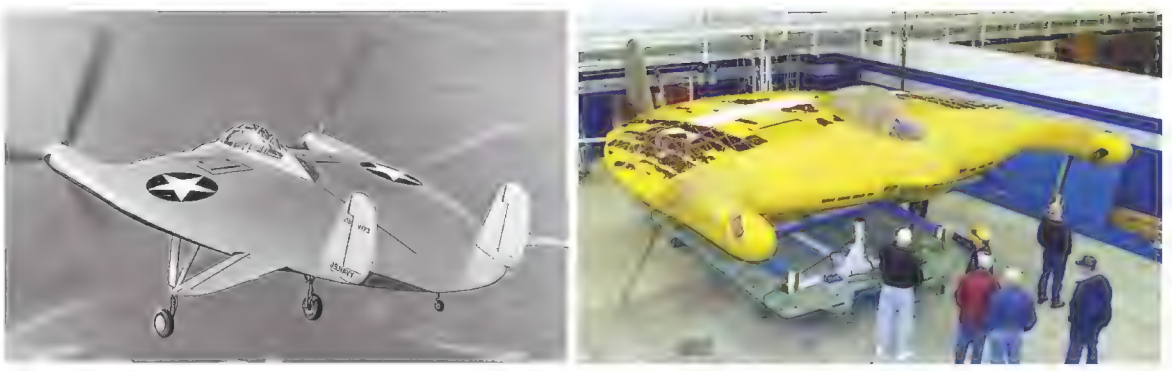
The plane, one of the oddest ever to fly, was conceived by Charles Zimmerman, an aircraft engineer at the National Advisory Committee for Aeronautics (NASA's forerunner). He designed the V-173 for the Navy, which was looking for a new high-speed carrier-based fighter capable of short takeoffs and landings. And sure enough, the Flying Pancake's winglike fuselage and huge propellers gave the craft exceptional lift, allow-

Built for speed and short takeoffs, the Flying Pancake was designed by Charles Zimmerman (inset). It first flew on November 23, 1942.

ing it to take off in just 200 feet.

It first flew November 23, 1942, at Vought's original plant, in Stratford, Connecticut. In 199 flights, it logged almost 132 hours in the air, and among its pilots was Charles Lindbergh. (It wasn't until after another pilot crashed the V-173 and walked away unharmed that Lindbergh decided it was safe enough for him to give it a try.)

Then, in 1948, with jet technology on the horizon, the Navy lost interest, and the peculiar little airplane went into early retirement, says Air and Space curator Russ Lee. The V-173 was sitting in a Smithsonian warehouse in Maryland when, four years ago, the company retirees, members of the Vought Aircraft Heritage Foundation, talked the Smithsonian into letting them restore the craft. "We built it. We have a passion for it," says Dick Atkins, 80, the foundation's chief historian.



The only V-173 ever built (left) was retired after six years and now resides at the Vought plant in Dallas (right), where the damaged fabric skin will be replaced.

But first they had to move it to Texas. At about 25 feet from wingtip to wingtip, it was too wide to travel on most highways. And it couldn't be disassembled. So 80-year-old Ray Neal, the program manager, designed a box that tilted the airplane, with its highest end just a foot shy of the height of highway overpasses. Not that the trek went without incident. "The box clipped a farmer's mailbox en route," Neal says, "but I think a 20-dollar bill took care of that."

The aircraft is showing its age. Strips of fabric skin dangled from its wooden structure, a Plexiglas panel was missing from the nose, and stuffing from the pilot's seat cushion was strewn around the cockpit.

To facilitate their handiwork, the restorers built what they call a "pancake rotisserie," steel bracing that allows them to turn the craft over. They plan to give it a new cotton skin, to clean and repair the 80-horsepower engines and to paint the craft its original yellow-and-silver scheme, among many other things. The work is expected to take another two or three years, at which time the V-173 is scheduled to be exhibited at the Dallas Frontiers of Flight Museum before heading to the Smithsonian. "To have the retirees step forward and give the Flying Pancake the same loving care that we would have," says Lee, "it's a win-win situation for everyone."

—DAMOND BENNINGFIELD

FROM THE ATTIC

REMEMBERING REAGAN It was January 20, 1981, and news of the release of 52 American hostages in Iran was competing for attention with the inauguration of a new president. That night, nine inaugural balls would be held, three at Smithsonian Institution museums. At 11:30 p.m. the new president and his wife, Nancy, arrived at the National Air and Space Museum (below) to deliver a few prepared remarks. Afterward, supporters asked him to pose beneath the wings of the Wright brothers' Flyer. As he did, he quipped, "No matter what they say, it isn't true that I flew that."

In 1986, the Smithsonian Institution Traveling Exhibition Service debuted a show about Hollywood, for which the president obligingly recalled some of his own Tinseltown experiences. Of a photograph of himself as a young man, he wrote: "Obviously it was one of the first studio portraits, because shortly thereafter they changed the part in my hair to the other side."

Ink Mendelsohn, then a writer for the now-defunct Smithsonian News Service, says the quote "caused quite a stir." That's because the part moved in the same direction as Reagan's politics—"from the left to the right," she says.

Mementos—including a program from the memorial service held at the Washington National Cathedral June 11, 2004, a national day of mourning for the 40th president—now reside at the National Museum of American History. *—BETH PY-LIEBERMAN*

NATIONAL AIR AND SPACE MUSEUM, S.I.; DICK ATKINS; RONALD REAGAN LIBRARY; P. 39 RUDY ARNOLD PHOTO COLLECTION, NASM, S.I.; INSET: NASA

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Refuge for Refugees

An Australian architect turns shipping containers into shelter

Sean Godsell (inset) equipped the 22-foot-long FutureShack (above) with the basics for living. "Everyone should benefit from good design," says the architect.

A RUSTING shipping container stands in the garden of the Smithsonian's Cooper-Hewitt, National Design Museum in Manhattan. It appears as though a Dumpster somehow jumped the fence. But the 22-foot-long container, shaded by a plastic, canopy roof and called FutureShack, is part of the second annual "Solos" exhibition, which features innovative, contemporary architecture and design works.

The container, once used to ship goods throughout China, has been artfully adapted by a 43-year-old Australian architect named Sean Godsell to serve as temporary housing for refugees, victims of natural disasters and other displaced or homeless people. It "shows the application of art and design to difficult, real-world issues," says curator Floramae McCarron-Cates.

One end of FutureShack swings up to form an awning and reveals a glass door. Inside, plywood covers the insulated walls, floor and ceiling. Two beds and a table fold out from the sides. At the far end is a kitchenette and a bathroom, outfitted with a shower and a stainless steel toilet. Two hatches in the ceiling and a window at the far end provide ventilation. Solar power generates electricity for lights and for heating.

FutureShack took shape in 1999, when the nonprofit group Architecture for Humanity sponsored a design contest for portable, inexpensive housing for refugees returning to Kosovo. Although Godsell's design didn't win, it earned high praise from the judges, prompting him to raise $28,000 and build a prototype. He figures the dwellings would cost as little as $15,000 apiece if mass-produced.

He says shipping containers were a natural choice not only because "they're recyclable and as common as coat hangers" but also because vehicles for transporting them and tools for handling them "exist everywhere on the planet, from Bogotá to Brisbane." The peaked roof (designed to evoke feelings of home), the iron ramp leading to the front door and the footings are all tucked inside for storage and transport. It takes a few people half a day to assemble a FutureShack, Godsell says.

So far, he has agreed to construct five units for an eco-tourism lodge in the Australian Outback—and turned down more than 1,000 requests from individuals wanting to purchase one. The people he most wants to hear from are relief workers. "Everyone should benefit from good design," says Godsell, "not just the people who can afford to commission it." —*JOHN F. ROSS*

WHO'S COUNTING?

3

SUMATRAN TIGERS WERE BORN AT THE NATIONAL ZOO ON MAY 2. THE MOTHER, 11-YEAR-OLD SOYONO, AND CUBS ARE DOING WELL. SUMATRAN TIGERS ARE CRITICALLY ENDANGERED, WITH FEWER THAN 500 REMAINING IN THE WILD, AND SOME EXPERTS SAY THE GREAT CAT WILL BE THE FIRST LARGE PREDATOR TO BECOME EXTINCT THIS CENTURY.

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EARL CARTER (2); SEAN GODSELL ARCHITECTS; JESSIE COHEN / SMITHSONIAN'S NATIONAL ZOO

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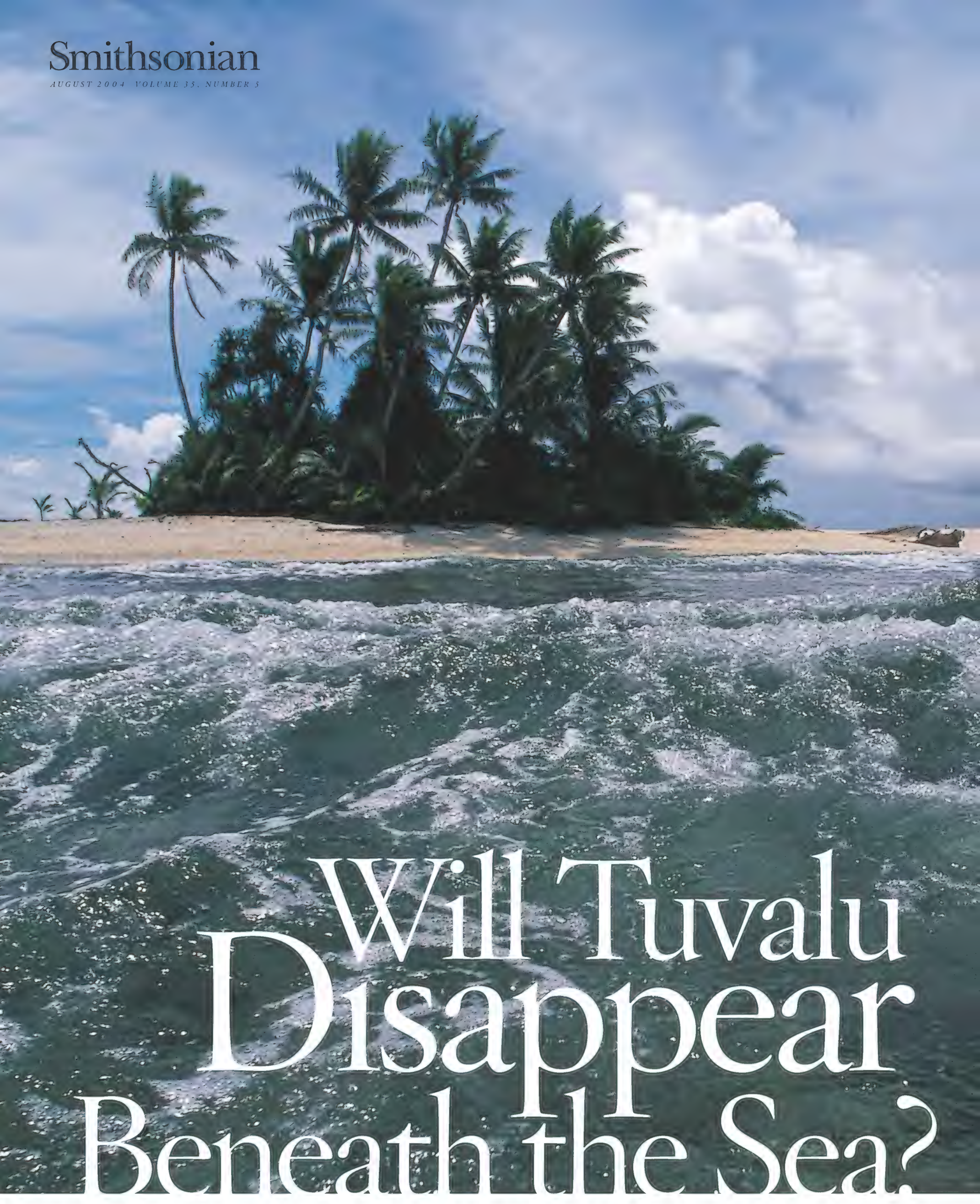
Smithsonian
AUGUST 2004 VOLUME 35, NUMBER 5



Will Tuvalu Disappear Beneath the Sea?

Global warming threatens to swamp a small island nation

BY LESLIE ALLEN

A THIN WHITE SMILE curves across the blank face of the South Pacific Ocean, more than a mile below. A little lower, the whiteness resolves into an arc of breakers, and the tiny turboprop heads straight for them. Only at the last moment does a filament of land seem to emerge from the ocean. We touch down at Funafuti International Airport, Tuvalu's only functioning airstrip, interrupting a soccer match on the runway.

The islands of Tuvalu, scattered over 500,000 square miles of equatorial ocean midway between Hawaii and Australia, appear so wispy and are so low-lying, no more than 15 feet above sea level, that it's easy to visualize the waves just washing over them. It's November, cyclone season, and I anxiously scan the area for high ground and finally settle on an unfinished three-story government building.

My uneasiness is stoked by dire pronouncements that Tuvalu's leaders have been making for more than a decade. The planet's fourth-smallest nation, they say, faces extinction because of climate change. Rising seas and deadly storms have reportedly started to swamp the islands, and fears are growing that Tuvalu will be uninhabitable or may vanish entirely within a few decades. Prime Minister Saufatu Sapo'aga told the United Nations last year that the global-warming threat is no different from "a slow and insidious form of terrorism against us." Independent scientists also offer a grim forecast. "Because of its location and physical nature, Tuvalu is particularly susceptible to the adverse impacts of climate change and in particular rising sea level," concludes a 1996 scientific study coauthored by the South Pacific Regional Environment Programme and the government of Japan.

Unlike other current or predicted environmental catastrophes, Tuvalu's problem is one that people worldwide are believed to create by burning fossil fuels that release carbon dioxide into the atmosphere, contributing to global warming. In that sense, my habit of leaving lights on around my house, in Washington, D.C., a neighbor's of constantly driving his large SUV to go just a few city blocks and another neighbor's preference for a toasty house in winter would play a role in Tuvalu's fate. In fact, Tuvalu threatened in 2002 to sue the United States and Australia for excessive carbon dioxide emissions. Meanwhile, some Tuvaluans are getting ready to abandon their homeland. "Islanders Consider Exodus as Sea Level Rises," the British newspaper *The Guardian* reported last year.

A new Atlantis? Maybe. But not all scientists agree that Tuvalu's future is underwater. Some critics have branded island leaders as opportunists angling for foreign handouts and special recognition for would-be "environmental refugees" who, they say, are exploiting the crisis to gain entry to New

A rising tide and severe storms may imperil the Pacific islands of Tuvalu (left, uninhabited Vasafua). With some islanders leaving, the nation of 10,000 has become ground zero in the debate about the consequences of burning fossil fuels.

Zealand and Australia. Others have even said that people and organizations sympathetic to Tuvalu are "eco-imperialists" intent on imposing their alarmist environmental views on the rest of the world.

The challenge is to see through the fog of rhetoric and conflicting scientific views to where global climate theory might—or might not—intersect with Tuvalu's people. But that's surprisingly difficult to do. Most experts who have weighed in on the matter haven't visited Tuvalu, and those who have made the journey typically have an agenda of their own. "Everyone arrives with a story," says Ursula Kaly, an Australian ecologist and former longtime environmental adviser to Tuvalu. "Their minds are made up beforehand." After I toured Tuvalu, reviewed the scientific evidence and spoke with climate experts and other scientists, I gathered that the nation and its nearly 10,000 people are indeed in trouble and may even be doomed. But rising seas are only part of the problem.

Just ten square miles of land, Tuvalu, formerly called the Ellice Islands, was settled by Polynesians and ruled by the British from 1892 until independence in 1978.

THIS AFTERNOON the wind is shrieking, the sky is gunmetal gray and the rain falls in thick sheets. Despite the deluge, the good news, says Hilia Vavae, the nation's chief meteorologist, is that seawater doesn't seem to be infiltrating neighborhood wells and taro patches or flooding onto the airport runway.

A rangy woman of middle years, Vavae cuts an unusual figure in her native Tuvalu: she is an Australian-trained scientist and a Muslim in a traditional and Christian society. Lately, she has also played Cassandra to her laid-back countrypeople. "I think we have a lot to worry about," she says later in her computer-filled office. "Cyclones and tropical storms have been getting much worse since the 1980s. We had a big drought starting in 1999. Flooding from extreme high tides is increasing also." Big swells and freak waves are washing over the island more frequently. And then there's a different kind of flood. "In the late 1990s, water started coming out of the ground—first puddles, then a whole sea. That had nothing to do with rain." The net effect, Vavae says, is that little by little Tuvalu is beginning to wash away.

Other islanders say much the same. Tauala Katea, a young employee at the meteorology station, says that ten feet of beachfront have disappeared over the past decade on the island of Vaitupu. Falealuga Apelamo, 77, a retired fisherman and farmer, says one small islet from the nearby atoll of Nukufetau has "drowned," another is almost gone and the sea is crashing through a third. "The big waves and winds and storms used to come in November and December," he adds. "Now it's any time of the year." At the northern tip of Funafuti, a gun emplacement, planted on dry land by U.S. soldiers in World War II, now sits 20 feet offshore. At the southern end, old-timers say, their meeting hall used to stand in the middle of the village. Now it is waterfront property.

It's this sort of devastation that prompts Tuvalu's leaders to cry foul. "The rest of the world should act immediately and together to cut down on its use of greenhouse gases," says Paani Laupepa, an assistant secretary in Tuvalu's Department of Foreign Affairs, headquartered on the second floor of a private home in Funafuti. By "rest of the world," Laupepa mostly means the United States and Australia, the world's largest overall and highest per capita producers, respectively, of greenhouse gases—and the only developed countries that declined to ratify the 1997 Kyoto Protocol, which calls for gradually reducing emissions of those gases. (U.S. officials say the protocol doesn't cover developing countries, sets arbitrary emission-reduction targets and would harm the economy.) "The United States, with a small percentage of the world's people, uses 25 percent of the world's resources," Laupepa goes on. "You Americans have a good lifestyle, all the conveniences, three or four cars per family. You need to appreciate the impact that has on our lives here."

SCIENTISTS FIRST SPECULATED about a link between carbon dioxide and atmospheric temperatures in the 19th century. But highly accurate measurements of atmospheric carbon dioxide levels didn't begin until 1958, when oceanographer Charles David Keeling of the Scripps Institution of Oceanography installed instruments atop Mauna Loa on the island of Hawaii. His findings of year-to-year increases are universally accepted. Beginning in the 1980s, analysis of deep ice-core samples extracted from ancient glaciers in East Antarctica and Greenland have yield-

LESLIE ALLEN is the author of the 2002 book Wildlands of the West, *about the U.S. Bureau of Land Management.*

MIKE REAGAN; PP. 44, 45 KENNEDY WARNE; P. 47 GIORA DAN; PATRICK AVENTURIER / GAMMA

"A real disaster," ecologist Ursula Kaly says of pits that U.S. forces dug in World War II (above, a Funafuti pit). "The sea could easily break through the island." Officials say population growth has also taken a toll on the environment. On Funafuti (below), the number of residents has more than doubled since 1980, to 4,500, straining fresh-water supplies and fostering erosion.

Clockwise, from top left: "We have a lot to worry about," says meteorologist Hilia Vavae (by the Australian government's tide gauge). Fisherman Falealuga Apelamo insists big storms are more frequent than ever. Foreign affairs official Paani Laupepa urges the world to cut carbon dioxide emissions. Meteorology staffer Tauala Katea (with weather balloon) says beaches have vanished.

GIORA DAN (3); MATTHEU PALEY / CORBIS

ed historical data on temperature and the atmosphere's chemical makeup.

The ice-core research shows a striking correlation between carbon dioxide levels and temperature. Moreover, carbon dioxide levels are now higher than at any time in the past 440,000 years. Before the Industrial Revolution, atmospheric carbon dioxide concentrations remained relatively flat. Since then, they have climbed by nearly a third and are now increasing at the unprecedented rate of 0.4 percent a year. And since the last ice age, about half the world's forest cover has been lost, and along with it an important mechanism for soaking up atmospheric carbon dioxide.

In the past century, average global temperatures at the earth's surface climbed by about 1.08 degrees Fahrenheit (.6 degrees Celsius) to their highest in at least a millennium. During the past 25 years, the rate of temperature increase has been even greater, about 3.6 degrees F, if extrapolated over a century. The ten warmest years since 1860 have all occurred since 1990, with 1998 being the warmest of all, according to the federal National Climatic Data Center. The years 2002 and 2003 are virtually tied for second place.

At the same time, researchers have documented changes consistent with an enhanced greenhouse effect. The world's landmasses aren't cooling off nearly as much as they used to when night falls. Less snow covers the Northern Hemisphere in winter. Less sea ice appears in the Arctic in spring and summer. Glaciers are retreating and shrinking, sometimes drastically; Mount Kenya's largest glacier has shrunk by more than 90 percent; Kilimanjaro's glaciers, by more than 70 percent; and 14 of Spain's 27 glaciers have disappeared altogether since 1980. Habitats for a number of plants and animals are moving to higher (cooler) latitudes. Warming spells threaten tropical reefs.

Scientists say they have ruled out natural causes, such as a periodic surge in the sun's output and volcanic activity, as an explanation for the climate change. "There is new and stronger evidence that most of the warming observed over the past 50 years is attributable to human activities," concludes *Climate Change 2001*, the third assessment report of the Intergovernmental Panel on Climate Change (IPCC), established by the World Meteorological Organization and the United Nations Environmental Programme. The report represents some 1,300 authors and 1,200 expert reviewers and editors and 100 national governments. Similar conclusions were reached by a 2001 U.S. National Research Council panel and U.S. Climate Action Report 2002, a multiagency project that Secretary of State Colin Powell submitted to the U.N.

Despite such an emerging scientific consensus, the Bush administration says that additional scientific data are needed to warrant the economic disruptions that mandatory carbon dioxide reductions would cause. U.S. Senior Climate Negotiator Harlan Watson has said the administration's approach to reducing greenhouse gas emissions was based principally on voluntary efforts and developing new, more fuel-efficient technologies. Yet the White House stirred controversy last year when it deleted sections of the Environmental Protection Agency's draft report on the state of the environment that referred to human contributions to climate change. Meanwhile, the federal Energy Information Administration is forecasting that U.S. carbon dioxide emissions from energy use will grow by nearly 40 percent in the next 20 years.

In the past, poorly constructed sea walls failed to protect Tuvalu shorelines. Today (a commercial reclamation project in Funafuti), Laupepa says, builders have to be "extra careful."

To the extent that disagreement exists within the scientific community, it relates to the future—how severe global warming is likely to be and what its effects will look like. Scientists use global climate models to develop scenarios. All the models project a warmer future: between 2.5 to 10.4 degrees F warmer by 2100. Even at the lowest end of the projected range, temperatures will climb more than twice as much this century as they did during the 20th. The projected increase, the IPCC report says, "is very likely to be without precedent during at least the last 10,000 years." The models also project that global sea levels will rise between 3.5 and 34.6 inches this century—and continue to rise for centuries. Even a lower-end sea-level rise of 11.8 inches would cause a typical shoreline to retreat 98 feet. Most of the projected rise will occur because water expands as it warms, but some of it will come from the melting of glaciers and ice caps.

Still, accurately gauging sea level is complicated and can quickly become a matter not of science but of politics, as Tuvaluans have recently learned.

KENNEDY WARNE

With the sea encroaching, some Tuvaluan families have relocated grave sites. Though flooding forces exhumations on other Pacific islands, such measures seem ominous on Tuvalu's.

ON FUNAFUTI'S deep-sea wharf is a structure that resembles a portable toilet enclosed in a wire-mesh fence. It is one of 12 monitoring stations around the Pacific that the Australian government has established since 1992 "to measure sea level and associated meteorological parameters."

The controversy began in 2000, when then director of Australia's National Tidal Centre (NTC), Wolfgang Scherer, announced that after seven years of measurements around the Pacific "there is no acceleration in sea level rise—none that we can discern at all." Tuvalu, in particular, got a pie in the face: the NTC announced that sea level at Funafuti had actually *fallen* by 3.42 inches since 1993. "Falling Sea Level Upsets Theory of Global Warming" read a headline from the London *Telegraph* at the time.

The announcement fed skepticism of Tuvalu's claims of impending doom. The nation's leaders had just started asking Australia and New Zealand to accept Tuvaluans as environmental refugees; doubters now saw this lobbying as a ploy to further Tuvaluans' economic prospects abroad. And "governments like those of Australia and the United States, which had been loud in their resistance to emissions targets, took heart," recalls geographer Patrick Nunn of the University of the South Pacific in Fiji.

But hidden in the NTC's findings was the reason Tuvalu's sea level fell. An especially powerful run in 1997 and 1998 of El Niño—a periodic disruption of ocean and atmospheric systems in the tropical Pacific that causes warm water to slosh eastward—left Tuvalu temporarily higher and drier. John Hunter, an oceanographer in Hobart, Tasmania, reanalyzed the NTC's records in combination with other data and found that sea level at Funafuti was in fact rising at about the same rate as the global mean. He also found that tidal maximums and minimums were growing more extreme year by year. As of this past December, the data from the Funafuti station show that sea level has risen there an average of 0.22 inches annually over the past decade.

New Zealand-based physical geographer Paul Kench, who has worked in Tuvalu, doesn't question the prospect of future sea level rise. But he does suggest that low-lying islands like Tuvalu won't necessarily be submerged. "Everyone thinks islands are all the same," he says. "People believe islands are static dollops of concrete, so that when the water goes up, the islands will just drown." But islands are not static, he goes on. Tuvalu and other atolls—ring-shaped coral islands surrounding a lagoon—are particularly dynamic, formed and replenished by coral gravels that break off the reefs and are tossed ashore. "The history of most small island states is littered with examples of islands growing in size, eroding away or fluctuating in response to changes in storm energy or cyclone winds," he notes. In Tuvalu itself, Kench says, a few tiny islands actually grew after 1972's Cyclone Bebe hurled rubble onto them.

Scientists generally assume that as sea level rises, sand and gravel erode away into the seabed as the shoreline recedes; accordingly, a place like Tuvalu will eventually disappear under a rising sea. "We think that's nonsense," Kench tells me. Instead, when big storms or rising sea levels send waves over a narrow atoll, he says, they can transport sand and other sediments across the island to the opposite shore. "It's what happens on the sandy barrier islands off the U.S. East Coast," says Kench, who has used computer models to test the scenario on atolls like Tuvalu. What the models projected, he says, was that waves washing over the island caused it to change shape and even move away from the reef edge, but not vanish.

Rising sea levels would prod the hard coral reefs just below the water surface to grow, building up the living shelf that helps protect shorelines. But most researchers believe that the increasing amounts of carbon dioxide dissolved in the water will retard the reefs' growth, and high temperatures will destroy many coral species, leaving shorelines more vulnerable than ever.

In the short run, other manifestations of climate change pose more of a threat to Tuvalu than sea level rise. "What we're already seeing in this region is more extreme weather events, though analysis of climate records is not complete," says New Zealand climatologist Jim Salinger, an IPCC author and expert on the tropical Pacific. Then he gives an example that shows how just a little global warming can go a long way. "As you heat up the atmosphere, it rains harder when it rains; but when it doesn't, things dry out faster because it's hotter.

PATRICK AVENTURIER / GAMMA

You get more flooding *and* more drought." Some scientists speculate that global warming may also increase the intensity of El Niño episodes, which spells trouble for Tuvalu because, Salinger says, "El Niños push cyclones toward Tuvalu."

Kathleen McInnes, a senior climate modeler at Australia's Commonwealth Scientific and Industrial Research Organisation, offers a similarly unsettling forecast for the island nation. "When warmer temperatures cause stronger cyclones to spin up, their lower central pressures can drive larger storm surges and waves right onto a place like Tuvalu," she says. "Tuvalu is a submerged volcano in the middle of the ocean with no shallow shelf to dissipate the waves' energy. Even waves from very distant storms can affect Tuvalu."

Tuvaluans themselves tell story after story of fiercer and more frequent storms. I'm taken in an aluminum skiff to see the starkest evidence for Tuvalu's claims. Funafuti Conservation Area Officer Semese Alefaio—Sam to visitors—tells the tale of two *motus*, or islands. First comes Tepuka, where we stroll through a lush forest, swim in clear waters and swig from a coconut that Sam splits open with his machete. This is the idyllic Before. Next comes a chilling After: barren, broken Tepuka-Sa-Vilivili, barely more than a sandbar where plastic bottles and other man-made rubbish run aground. "This used to be like the other motu," Sam says, "before the big storms and waves started coming."

IF THERE'S LITTLE DOUBT that humankind is unwittingly nudging Tuvalu toward oblivion, the question is how to distribute the blame. During World War II, U.S. forces built a major staging ground in Tuvalu—then the British-ruled Ellice Islands—for an assault on Japanese-held Tarawa to the north. Ecologist Ursula Kaly says the serious erosion along Funafuti's lagoon-front was set in motion by the wartime backfilling and building of sea walls, most of which disintegrated long ago.

Mataio Tekinene, Tuvalu's director of environment, shows me where the coral building materials for Funafuti's runway, sea walls and a dozen other World War II projects came from—deep pits in the porous coralline ground now filled with brackish water and trash. Islanders fear that a big storm could force churning seas through the pits and break through to the lagoon, flooding the island.

But the armed forces aren't the only guilty parties. Residents quarried for rocks, gravel and even sand for building materials, Tekinene says, promoting erosion. These days, construction materials for big projects must be imported. International aid organizations have also contributed to the problem—for instance, by encouraging Tuvaluans in the late 1980s to replenish a sea wall with beach rubble tossed ashore by a cyclone. The wall has disintegrated, and the shoreline, once protected by the rubble, is exposed.

NATIONAL ARCHIVES; KENNEDY WARNE

During World War II, the U.S. military used Tuvaluan islands (above left, northernmost Nanumea) as a staging ground for operations in the Pacific. Islanders say military construction projects have hastened the islands' environmental decline. More recently, storms have wreaked havoc. A 1997 cyclone laid waste to once idyllic Tepuka-Sa-Vilivili (above right, foreground).

Tuvaluans will survive "even if our islands drown," says former prime minister Koloa Talake (with his wife, Tilesa, in Auckland). He partly blames U.S. pollution for his homeland's plight.

And then there's the population boom. Since 1980, the population of Funafuti has more than doubled, from about 2,000 to 4,500, or almost half of Tuvalu's citizenry. "It can be a little tricky to judge which environmental effects are induced locally by humans and which are created by human societies outside Tuvalu," Tekinene says.

In a way, Tuvalu is the planet writ small. Its poor environmental stewardship (which may hasten the effects of global warming) is no more egregious than that of most other, bigger countries. But because it is fragile, remote, resource-poor and low-lying, Tuvalu has less room for error than most other nations. The consequences—and the future—arrive sooner. And with greater force.

IN A SPOTLESS KITCHEN decorated with children's drawings in suburban Auckland, New Zealand, I drink tea with Koloa Talake, a Tuvalu native and the nation's prime minister for nine months starting in December 2001. Talake had served on the board of a California company that in 2000 purchased the rights to Tuvalu's Internet domain address extension (.tv), and he helped negotiate its resale to another U.S. company in 2002. That same year, Talake announced that Tuvalu, joined by Kiribati and the Maldives, planned to sue the United States and Australia at the International Court of Justice in the Hague. The plaintiffs had planned to argue that the developed nations' disproportionate carbon dioxide emissions contributed to global warming, which poses a threat to the islanders. But Talake failed in his reelection bid later that year, and the new government has not pursued the litigation. Whether a nation could prevail in such a lawsuit is open to question. For one thing, establishing a direct link between a particular nation's greenhouse gas emissions and harm to Tuvalu is problematic. For another, the United States does not accept the jurisdiction of most international courts.

Talake says he had hoped his lawsuits would bring Tuvalu "several million dollars for the damage caused by emissions." But that was secondary, he adds: "We are asking for a place to live if the tide comes against us. There are a lot of places in Australia and maybe America with no people." He and his wife, Tilesa, now live in Auckland, along with their two sons, an engineer and a chef, and their families. "We have no children left in Tuvalu to take care of us," he says.

Talake is part of a growing Tuvaluan community in New Zealand of some 2,000. Affluent Tuvaluans have long traveled here for higher education and good healthcare, but today's newcomers more often pick strawberries for a living. I meet some of them at a church service in an Auckland suburb on a gray, blustery Sunday. The Reverend Suamalie Iosefa smiles broadly. But his face is weary. As a preacher and mental health worker, he deals with problems born of poverty and overcrowding, not to mention the shock of social dislocation. "Imagine moving from a nation without a stoplight to a modern city of a million people," he says.

Iosefa thinks New Zealand offers a brighter future than Tuvalu "education-wise, health-wise, and especially because people feel threatened by global warming." Acknowledging that threat, New Zealand's government in 2002 established a new quota program for Pacific Islanders, which allows up to 75 Tuvaluans a year to immigrate. But Iosefa says no more than 21 people were approved in 2003.

As the voices of the men's and women's choirs rise in the hall, the stalwart hymns of England take wing on the rich harmonies of Polynesia. Most of the assembled, some 200 adults and children, sit or recline on mats. A quarter of the people in the room have overstayed their visas and face deportation. But Sutema Keakea, who has two young daughters and is 39 weeks pregnant, is among the lucky ones. A bank employee in Tuvalu, she just received approval for permanent residency under the new program. She left Tuvalu to be near other relatives, she says: "People do say they're afraid of global warming and sea level rise, but I just don't know."

On this day, some of the Tuvaluans say they ponder the story of Noah and the Flood for clues to their future. "In Noah," says one man, "the rainbow was a sign of God's promise that there won't ever be another flood again." But another congregant disagrees. "Sea level will rise because things are different now from the old days," he says. "The world God created was perfect, but people have made it imperfect."

KENNEDY WARNE

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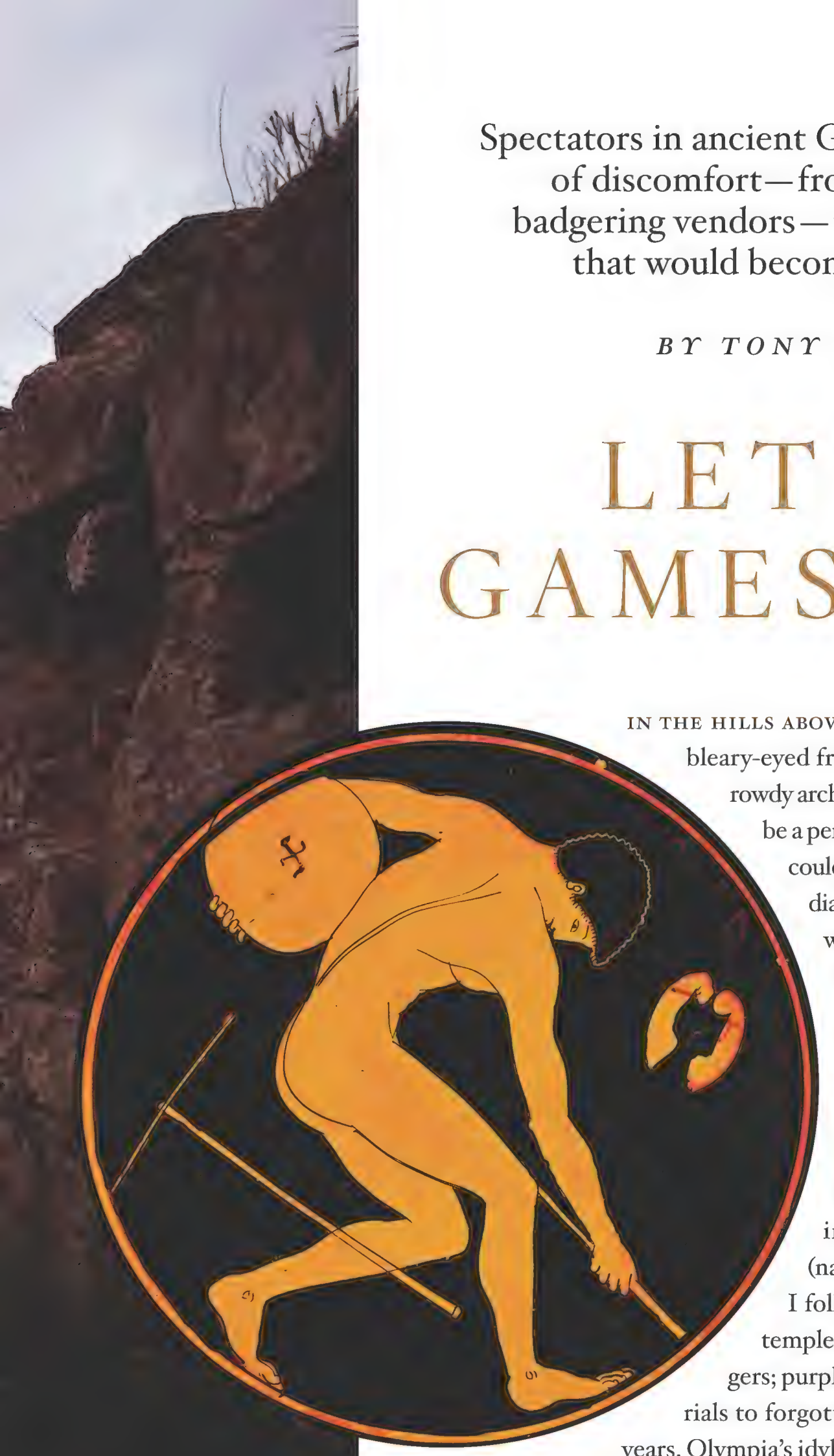
Spectators in ancient Greece endured all manner of discomfort—from oppressive heat to badgering vendors—to see the pagan festival that would become today's Olympics

BY TONY PERROTTET

LET THE GAMES BEGIN



IN THE HILLS ABOVE OLYMPIA, I awoke before dawn, feeling bleary-eyed from the Greek wine I'd drunk with some rowdy archaeologists the night before. It was going to be a perfect summer day: from my hotel window I could see clear sky over the mountains of Arcadia, whose peaks covered the horizon like the waves of a wild blue sea. I needed some exercise—a jog to clear my head. But where should I run in this corner of the rural Peloponnese? Where else, it occurred to me, but in the ancient Olympic Stadium?

I arrived at the ruins—about 500 yards from the center of Olympia, a town of about 3,000—just before the rising sun, wearing an old pair of Nikes (named for the winged goddess of Victory). I followed a trail past fallen columns of great temples, splayed out in the grass like skeletal fingers; purple wildflowers pushed up between memorials to forgotten sports champions. In the past 2,500 years, Olympia's idyllic pastoral setting has changed little: the river Alpheus still gurgles in its shady bed alongside the Gymnasium; to the north rises a conical hill, bristling with pine forest, where, according to legend, Zeus wrestled his father, the Titan Kronos, for control of the world.

The entrance to the ancient stadium at Olympia (left) was originally a tunnel. Ancients believed that Hercules himself had laid out the Stadium's 210-yard track. Vase paintings (a discus thrower on a sixth-century B.C. vessel) record the events of the earliest Games.

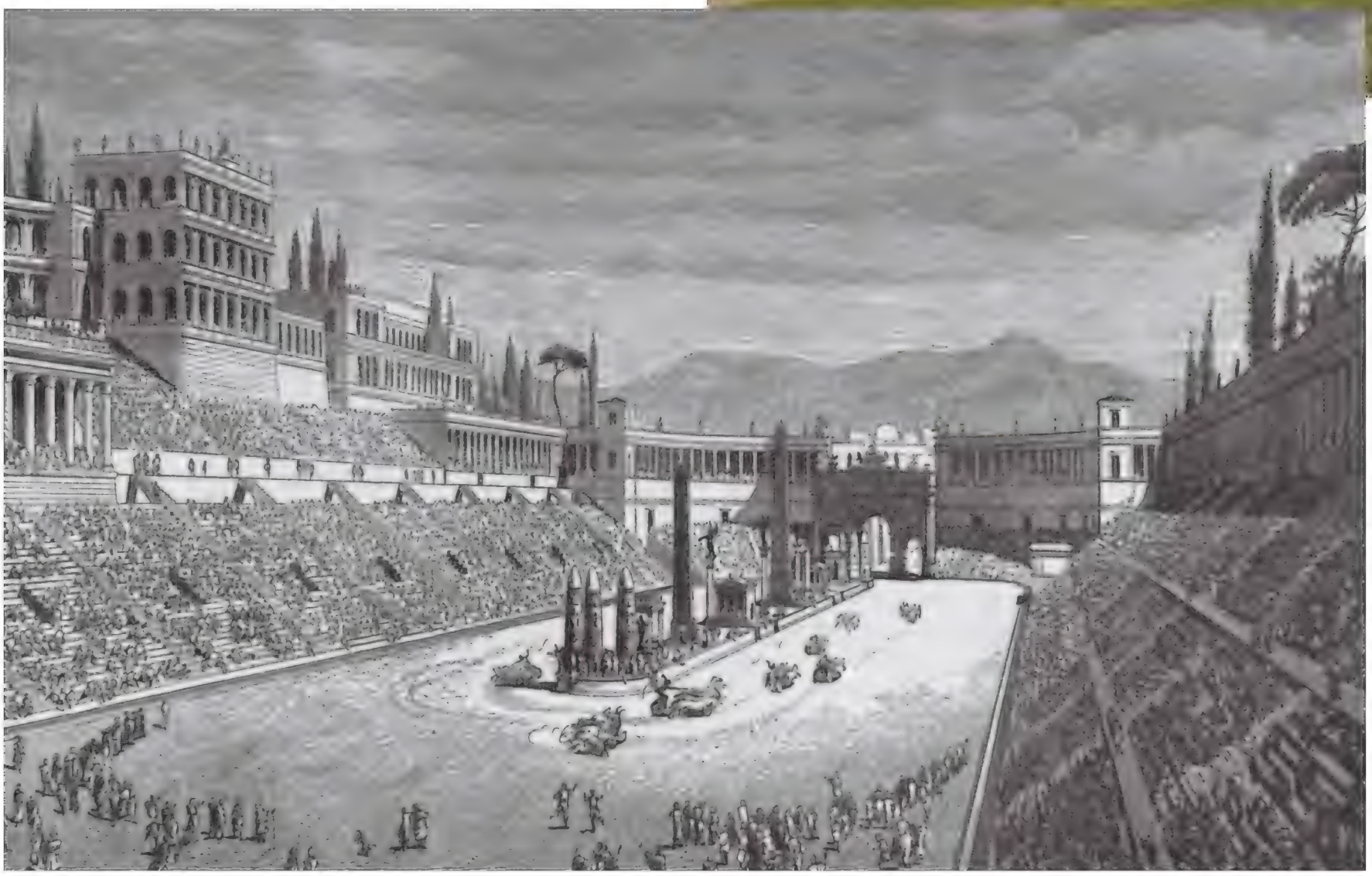
Ruins of a stone archway still frame the entrance to the Stadium, which on this morning was bathed in yellow light. Rising on each side of me were earth embankments, now swathed in succulent green lawn. And there, at the very center of the Stadium, was the famous clay running track, bordered by stone gutters. Ancient Greeks believed the track's 210-yard length had been marked out by Hercules himself. For nearly 12 centuries, it was the focus of the greatest recurring festival in Western history.

I approached the ancient starting line—a white marble sill that is miraculously intact—kicked off the Nikes and curled my toes into its grooves. Nothing broke the silence except the buzzing of bees in the distance. And then I was off, racing in the footsteps of ancient champions.

AT A COMPARABLE HOUR during festival days about 150 B.C., there would have been at least 40,000 spectators crowded onto those same green embankments. These were sports fans from every level of society. The majority were male; married women were forbidden to attend, although unmarried women and girls were allowed in the stands.

Ten bearded judges in indigo robes and wearing garlands of flowers would have taken their places in a booth halfway down the track. Before them, on a table of ivory and gold, were the first Olympic prizes—olive-wreath crowns cut from Olympia's sacred tree. An excited murmur would fill the Sta-

Travel writer TONY PERROTTET wrote the June 2004 SMITHSONIAN article on the Seven Wonders of the Ancient World.



P. 54 ROGER WOOD / CORBIS; PP. 54, 55 ERICH LESSING / ART RESOURCE, NY

Some 40,000 boisterous spectators packed the ancient stadium during festival days (above, what remains of the venue today, with its still-intact 210-yard track, and left, as an opening-day chariot race was imagined by a lithographer many centuries later).

dium when, with the blast of a trumpet, the athletes began to emerge from a tunnel built into the western hillside.

They appeared one by one—parading like peacocks, entirely unclothed and unadorned, yet dripping from head to toe in perfumed oils that flowed in rivulets from their curled black hair. Competing nude was a time-honored tradition as central to Hellenic culture as drinking wine, discussing Homer or worshiping Apollo; only barbarians were ashamed to display their bodies. Nakedness also stripped away social rank, a nod to classlessness in the status-obsessed ancient world (although contestants still had to be freeborn males of Greek descent). A sacred herald declared the name of each athlete, his father's name and his home city before asking if anyone in the crowd had any charge to lay against him. Then, to the cheers of admirers, the contestants warmed up under the eyes of their trainers.

From *The Naked Olympics* by Tony Perrottet, © 2004 by Tony Perrottet. Published by arrangement with Random House, an imprint of Random House Publishing Group, a division of Random House, Inc.

The cries and jeers of the crowd subsided when the sacred heralds raised their trumpets, giving the call for the 20 athletes to "take their positions, foot to foot, at the *balbis*"—the marble starting line. Rather than crouch, sprinters stood upright, leaning slightly forward, feet together, arms outstretched, every muscle poised. A rope was stretched before them at chest height, creating a rudimentary starting gate. Contestants tended to eye the barrier respectfully: the punishment for false starts was a thrashing from official whip bearers.

The chief judge nodded, and the herald cried *apete*—go! And as the athletes sprinted down the track, the roar of the spectators would echo through the countryside.

FOR THOSE IN THE CROWD, it was a thrilling moment—if only they could forget their discomfort. Surviving a day in the Stadium, where admission was free, was worthy of an olive wreath in itself. The summer heat was oppressive even in the early morning, and many in the crowd would, like me,

ARIS MESSINIS / AFP / GETTY IMAGES; P. 56 BETTMANN / CORBIS

have been feeling the effects of the previous night's revelries. For up to 16 hours, spectators would be on their feet (the root meaning of the ancient Greek word *stadion* is actually "a place to stand"), exposed to sun and the occasional thunderstorm, while itinerant vendors extorted them for sausages, often-stale bread, and cheese of dubious origins, to be washed down with resinated wine. Because summer had reduced local rivers to a trickle, dehydrated spectators would be collapsing from heatstroke. Nobody bathed for days. The sharp odor of sweat from unbathed bodies did battle with Olympia's fragrant pine forests and wildflowers—and with intermittent wafts from dry riverbeds used as latrines. Then there were Olympia's plagues of flies. Before every Games, priests at Olympia sacrificed animals at an altar to "Zeus the Averter of Flies" in the forlorn hope of reducing the infestations.

Even before they arrived, fans would have suffered manifold indignities. The lovely sanctuary of Olympia was remote, nestled in Greece's southwest corner 210 miles from Athens, so to get there most spectators had traipsed rough mountain highways, at least a ten-day journey; international spectators had risked storms and shipwreck to sail from as far away as Spain and the Black Sea. When the weary travelers arrived, they found a venue sadly unprepared to accommodate them. "An endless mass of people," complained second-century writer Lucian, utterly swamped Olympia's modest facilities, creating conditions similar to a badly planned rock concert of today.

The only inn at Olympia, the Leonidaion, was reserved for ambassadors and other officials. The Sacred Precinct of Zeus—a walled-off enclave of temples and shrines—was besieged on all sides by a vast campground, and rowdy throngs competed for space in it, in keeping with their station. Most simply flung bedding wherever they could. Others rented space in temporary shelters or put up tents. Plato himself once slept in a makeshift barracks, head to toe with snoring, drunken strangers.

Thousands of cooking fires created a fog of smoke. Crowd control was enforced by local officials with whips. And yet, as attendance figures suggest, none of these miseries could keep the dedicated sports fan away. The Games were sensationally popular, held without fail every four years from 776 B.C. until the Christian emperors banned pagan festivals in A.D. 394—a run of nearly 1,200 years. For the Greeks, it was considered a great misfortune to die without having been to Olympia. One Athenian baker boasted on his gravestone that he had attended the Games 12 times. "By heaven!" raved the holy man Apollonius of Tyana. "Nothing in the world of men is so agreeable or dear to the Gods."

What kept fans coming back, generation after generation? It was a question that the Athenian philosopher and sports buff Epictetus pondered in the first century. He con-

Competing nude (below, a 19th-century drawing of an ancient footrace at Olympia) was a time-honored tradition. During the Games, the area near the sanctuary (right, what remains of the Palestra, where athletes practiced) became one vast campground.

BETTMANN/CORBIS; P. 59 VANNI / ART RESOUCE

cluded that the Olympics were a metaphor for human existence itself. Every day was filled with difficulties and tribulations: unbearable heat, pushy crowds, grime, noise and endless petty annoyances. "But of course you put up with it all," he said, "because it's an unforgettable spectacle."

And sports were only part of it. The Games were the ultimate pagan entertainment package, where every human diversion could be found, on and off the field. Each Olympiad was an expression of Hellenic unity, an all-consuming pageant for pagans as spiritually profound as a pilgrimage to Varanasi for Hindus or Mecca for Muslims. The site had grand procession routes, dozens of altars, public banquet halls, booths for sideshow artists.

For five hectic days and nights, Olympia was the undisputed capital of the world, where splendid religious rituals—including the butchering of 100 oxen for a public feast—competed with athletic events. There were sacred sights to see: the sanctuary of Olympia was an open-air museum, and visitors went from temple to temple viewing such masterpieces as the 40-foot-high statue of Zeus, one of the Seven Wonders of the Ancient World.

And then there were earthly pursuits: the squalid tent-city was the scene of a round-the-clock bacchanal where students could squander their inheritances in lavish *symposia* (drinking parties) and some prostitutes made a year's wages in five days. There were beauty contests, Homer-reading competitions, eating races. Masseurs offered rubdowns to the weary. Young boys in makeup performed erotic dances. There were palm readers and astrologers, soapbox orators and fire-eaters. A starry-eyed pilgrim might be excused for forgetting about the athletic contests—were they not themselves so theatrical.

Of the 18 core events in the Olympics program, some are familiar today—running, wrestling, boxing, javelin, discus. Others are less so. The Games began with a chariot race—a deliriously violent affair, where up to 40 vehicles crowded the track and crashes were guaranteed. Often, only a handful of chariots would complete the course. The *hoplitodromia* was a 400-yard sprint in full armor. The long jump was performed with weights, to the accompaniment of flute music. One of the favorite audience events was the *pankration*, a savage all-out brawl, where eye gouging was the only banned tactic. The more brutish participants would snap opponents' fingers, or tear out their intestines; the judges (one coach noted) "approve of strangling." There were no team sports, no ball sports, no swimming events, no marathon and nothing resembling an Olympic torch. (The marathon was introduced in 1896 and the torch was added at Hitler's 1936 Olympic Games in Berlin.)

All the vices of our modern Games were present at their birth. Despite the Sacred Olympic Truce, which supposedly banned all wars that might mar the success of the event, the ancient Games were often caught up in Greek internal politics. (The Spartans were banned from attending in 424 B.C. during the Peloponnesian War.) A military force from Elis once even attacked Olympia itself, in the middle of a wrestling match, forcing defenders into positions on tops of temples.

Corruption charges would regularly disgrace contenders. As early as 388 B.C., a certain Eupolus of Thessaly bribed three boxers to throw their fights against him. Not even judges were above suspicion. In A.D. 67, they accepted hefty bribes from the Roman emperor Nero, awarding him first prize in the chariot race—notwithstanding that he fell out of his vehicle and failed to complete the course.

In fact, money permeated every aspect of ancient athletics. The contestants, professionals all, lived on stipends from civic bodies and private patrons and traveled in troupes from one sporting event to the next, picking up cash prizes as they went. (Tellingly, the ancient Greeks did not even have a word for amateur; the closest was *idiotes*, meaning an unskilled person, as well as an ignoramus.) If an olive wreath was the official Olympic prize, champions knew that the real rewards were more consequential: they would be treated like demigods and guaranteed "sweet smooth sailing," as the poet Pindar put it, for the rest of their natural lives.

Beyond the official prize of an olive wreath, champions at Olympia (below, victors are crowned in a c. 1777-84 painting) were treated like celebrities. The *pankration*, a savage brawl (above, depicted on a c. 525-500 B.C. amphora), delighted spectators.

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"It's like a high-school reunion," says Willi Richards (at right with guide dog Victoria) of a visit to Bedford Hills Correctional Facility in New York to see Mercedes Smith (above), who trained the dog as a puppy. "Raising Victoria was the hardest thing I've ever done," says Smith.

NEW LEASH ON LIFE

In an innovative program, prison inmates find that raising puppies for the blind makes all the difference

BY CHRISTINA CHEAKALOS

PHOTOGRAPHS BY ENRICO FERORELLI

WILLI RICHARDS nearly loses his footing when his guide dog, Victoria, lurches forward. It's a stunning lapse in behavior, one that Richards, 47, has rarely experienced in the three years since Victoria, a black Lab, became his eyes. "Victoria is usually so polite," he says. She sits through Sunday worship without fidgeting, bearing a beatific expression that disarms the church ladies. Just this morning, Victoria got Richards from his Brooklyn apartment to Grand Central Station and then onto a crowded train with a calm purposefulness not generally evident in rush-hour commuters.

But a little over an hour later, when the pair arrive at Bedford Hills Correctional Facility, a maximum-security prison for women in Westchester County, New York, Victoria's composure fails her and she makes a beeline for the prison entrance.

Richards laughs at her excitement, and quickens his pace as she leads him through guarded gates and steel doors, up a hill and into a low-slung housing complex where two dozen inmates have been eagerly awaiting them. Some call out, but 39-year-old Mercedes Smith sits quietly in a green plastic chair in the middle of the room. Then she opens her arms wide, and in a flash Victoria is by her side. "My girl," Smith says, cradling Victoria's head. "My good, *good* girl." Then Smith rises and hugs Richards. "Thank you for coming, Willi."

"No, thank you, Mercedes," he responds, "for Victoria." Richards turns to face the other women. "And thank all of you for what you do," he says. "Believe me, you are making a big difference in the world."

"I've tried it all . . . I've been a Muslim, I've been a Catholic, you name it, doing whatever I could to run away from myself."

Some of the women tear up. One or two crack jokes to hide their embarrassed pleasure. Like Smith, these women are convicted felons, serving hard time for hard crimes. But through a nonprofit program called Puppies Behind Bars (PBB), they also are allowed to raise guide dogs for blind people—and, since 9/11, bomb-sniffing police dogs.

Raising a potential guide dog is a serious and lengthy proposition. Puppies arrive at about 8 weeks of age and spend the next 16 months in the care of inmates who are responsible for their nurturing and training 24 hours a day. At night, the puppies curl up in the prisoners' locked cells.

In a way, the prison serves as a sort of canine prep school. The "puppy raisers," as they are called, teach the dogs manners and obedience before they begin formal training.

But the teachers say they are learning even more. "Raising Victoria was the hardest thing I've ever done," says Smith, who has served 12 years of a 20-years-to-life sentence for second-degree murder. "And next to my children, she is the best thing I've ever done in my life."

Seven years after it began, Puppies Behind Bars has expanded to six prisons in New York, New Jersey and Connecticut, where 52 women and 61 men are currently raising 56 dogs. "Most people can change," says Elaine Lord, who retired recently as superintendent after working nearly 20 years at Bedford Hills. "We need to give inmates meaningful work that will bring about that change—because most of them will get out, and our job is to make sure they aren't dangerous to society, but contributing members of society."

The program costs participating states nothing. PBB's $650,000 annual budget comes entirely from donations. Corporations such as J.P. Morgan Chase can sponsor and name a dog for $3,000. Comedian Chevy Chase (pup: Chevy) and actress Doris Roberts of "Everybody Loves Raymond" (pup: Raymond) are supporters. A network of about 300 volunteers does everything from chauffeuring the pups to veterinarians to taking them home on weekends and introducing them to situations they wouldn't experience in prison: ringing phones, busy streets, rambunctious children.

Roslyn D. Smith, 42, has been behind bars for a quarter-century, sentenced at age 17 to two consecutive 50-years-to-life terms for three counts of second-degree murder and first-degree robbery. "I've tried it all, from drugs to the homosexual life," she says. "I've been a Muslim, I've been a Catholic, you name it, doing whatever I could to run away from myself." She has raised three puppies. "The puppies are so alive and trusting and hopeful, you can't help but become a better person for them, and for yourself."

PBB WAS STARTED at Bedford Hills in 1997 by Gloria Gilbert Stoga, 49, then serving on New York City mayor Rudolph Giuliani's Youth Empowerment Services Commission. Few thought anything good would come of the program. Some corrections officers didn't believe inmates deserved to raise puppies. Or they feared the prisoners would mistreat them, or train them to attack guards. Stoga understood their concerns. A self-described political conservative, she had little regard for criminals. But in 1991, she adopted an 18-month-old black Lab, Arrow, that had been released for medical reasons from Guiding Eyes for the Blind in Yorktown Heights, New York. And four years later, she read a newspaper story about prisoners in Ohio who raised puppies for the blind.

CHRISTINA CHEAKALOS freelances from her home in New York. ENRICO FERORELLI, a frequent contributor, photographed macaques in the March issue and Dubrovnik in June 2003.

"I somehow intuitively grasped what [raising dogs] could do for prisoners," says Gloria Stoga (top, at left, at Bedford Hills), who founded Puppies Behind Bars in 1997. Blindfolded Bedford Hills inmates (bottom) take turns relying on Victoria to get around.

Puppy trainers (above, left to right: Roslyn Smith with Grant, Nora Moran with Fairfield and Chrissy Ceravolo with Valor) are among the 35 prisoners at Bedford Hills who work with the animals. Except for mealtimes, when dogs are prohibited from the mess hall, the inmates are with their charges 24 hours a day, handling everything from cleaning up accidents to clipping the dogs' toenails. "My whole personality has changed," says Cathy Beaudoin (below, with Zora, a black Lab). "I used to be the mouse that didn't roar. I would hide in my room and sulk. This program has given me a purpose to get up in the morning."

In 2003, Vincent Vacante (below, with Pierre at New York's Fishkill Correctional Facility, where he is serving 18-years-to-life for murder) learned that the first dog he raised, Mikaela, died while being spayed six weeks after he said good-bye to her. Inmates (among them, above, from left: Carlos Modesto with Judy, Luis Escalera with Corcoran, Edward Stoll with Sirius) rallied around him with words of comfort. "I never expected camaraderie in prison," says Vacante, whose parents keep Mikaela's ashes, pictures, collars and tags in a special place in their home. "Through these dogs, we've become friends—and responsible men."

"Here were people written off by society raising puppies written off as guide dogs," says Stoga. "And they *succeeded*!"

Every few months for the next two years, Stoga, who worked for Giuliani finding jobs for inner-city kids, would reread the article and cry. Finally, she says, her husband said, "Do something about it, or let it go."

Letting go is not something Stoga does easily. She got a second released dog, 8-week-old Carlos, for Christmas, quit her job, and learned how to train him by going with him through the Guiding Eyes guide dog program. "I already knew the impact these dogs make in the lives of blind people, and I somehow intuitively grasped what they could do for prisoners," says Stoga. "It just made perfect sense."

But none of the guide dog schools she contacted agreed. Even after she'd gotten a go-ahead from Bedford prison to begin her program, she had no puppies. Frustrated, Stoga made a calculated bet. She offered to buy five puppies rejected by Guiding Eyes for the Blind—at $500 apiece—to board with the inmates. Three weeks later, the Guiding Eyes board decided to give her the rejected dogs for free. "Here were people written off by society raising puppies written off as guide dogs," she says. "And they *succeeded*!" Two of the five puppies went on to become guide dogs.

A little more than half of the puppies raised by inmates become guide dogs. (The others are let go mostly for health or personality reasons.) Since Stoga's initial success, Guiding Eyes has supplied most of PBB's puppies, about 35 a year.

"The inmates are highly motivated and raise very well-behaved dogs, as good as those of our best raisers," says Jane Russenberger, senior director of breeding and placement for Guiding Eyes. The organization pairs some 165 blind people with dogs each year at a cost to the school of $28,000 per dog. Recipients pay nothing.

Inmates who raise puppies are carefully chosen. Applicants must have a clean disciplinary record for at least a year, and they are further screened and interviewed by prison officials, by Stoga and by other raisers. ("Any of you got a problem with picking up poop or vomit, say it now!" demanded one PBB inmate to three visibly nervous candidates.) Two raisers—a primary caretaker and a backup—are assigned to each puppy. The inmates, who live with their pups in a housing unit separate from the general prison population, take the dogs most everywhere, from prison jobs to dental appointments. There's a six-hour training session once a week. The raisers learn how to teach their charges to climb stairs, come when called and to neither bark nor beg. One inmate, whose pup was destined for a guide dog school in France, learned to give commands in French. "To watch them grow and learn and to know that you're responsible, well, that goes deep," says Jean Coaxum, 50, who has served 20 years of a 15-years-to-life term for second-degree murder and attempted robbery—and is now raising her fifth puppy. "You get confidence, and you believe that you can do something good."

SINCE NOVEMBER 1998, Jim Hayden has watched the puppies work their magic at Fishkill Correctional Facility, a prison that houses 1,750 men in Beacon, New York. Though only 25 of the inmates are raisers, "the dogs have had a calming, humanizing effect on the entire staff, me included," says Hayden, who is assistant deputy superintendent of programs. "They've broken these inmates down, taken their hard shells and cracked them open. Their level of love for and commitment to these dogs is something I never expected to see."

A 20-month analysis sponsored by the pet food company Iams, which donates food for PBB, supports Hayden's observations. Prisoners who raised puppies reported greater overall well-being than a group of inmates who hadn't

"This has changed my relationship with my kids," says Carlos Modesto (top right, with Judy and inmate Jake Charest, with Elliot). "'My dad's doing something important,'" he says his children tell their friends. "'He's raising guide dogs for blind people.'"

"I've seen 6-foot-2, 250-pound guys rolling around on the floor kissing and talking in a high voice to their dogs. We *all* do it."

worked with the dogs. The PBB inmates proved more compassionate and responsible, and believed they could turn their lives around.

Tony Garcia, 42, raised four PBB dogs before being released from Fishkill last January after serving 16 years for armed robbery. He now supports a wife and four children by painting apartments and has applied for a full-time job as a case worker for an organization that aids ex-convicts. "The patience and hope I have, and my willingness to work hard," says Garcia, "I got from being in that program."

Jake Charest, 27, who is serving his ninth year of a 7-to-21-year sentence for attempted murder, is raising his second dog, Skip. "All of us in the program are sorry for what we've done, but instead of just saying it, which is easy, we're showing it," he says. "These dogs make time here almost bearable."

LIKE PRISON INMATES everywhere, most of the puppy raisers at Fishkill had perfected the intimidating look that says, "Don't mess with me." That facade does not work with puppies. "Your macho persona is a goner with these dogs," says Ronald Jones, 33, who has served 12 years of a 15-years-to-life sentence for murder. He is raising his second dog, an impish 8-month-old black Lab named Cooper. "I've seen 6-foot-2, 250-pound guys rolling around on the floor kissing and talking in a high voice to their dogs. We *all* do it, even in the yard with 200 other inmates and guards walking by. We don't care what anybody thinks. It's all about what's good for the dogs. We owe them. They did what nothing or nobody could—they took away our selfishness." The raisers fill their cells with squeak toys and chew bones as well as photographs of their pups past and present. Paintings of puppies and stenciled paw prints also adorn the concrete walls of the dank basement room that serves as Fishkill's training center.

Veteran raiser Thomas Lonetto, 33, convicted a decade ago for robbery and attempted murder, says he learned more from giving up his first dog than taking care of it. "I felt what my mother must have felt on the day I was sentenced, when she stood next to the 24-year-old son she loved, who was going away for a very long time," he says. "It's called empathy. I didn't know it existed in me until that moment."

The women at Bedford Hills express similar sentiments. "We're not raising these dogs, we're in partnership with them and with each other," says 24-year-old Nora Moran, who is serving 10 to 20 years for assault and armed robbery. "The love we get and the love we give reaches society before we get there, in the form of these wonderful working dogs."

Yet the program is hardly a panacea. Some raisers quit because they can't get along with the group, or won't obey Stoga's orders (one inmate told her she was a "martinet"). Others are kicked out for violating prison rules. Nor has the program so far made any perceptible dent in a recidivism rate that sees two out of three inmates rearrested within three years of their release.

IT IS ALMOST TWO in the afternoon. Willi Richards has handed out cookies and photographs of Victoria—on the lap of a department store Santa, wearing a flouncy hat at Easter—and he has let Mercedes Smith reconnect with her "good, *good* girl." He stood by, a big smile on his face, as the women took turns being blindfolded and led by Victoria around an obstacle course of strategically placed chairs. "It's not easy being blind, is it?" Richards said to the group. Now, as he takes Victoria's handle and leash and heads down the hill to go home, he stops and turns back toward the women. "Before Victoria, I was a prisoner in my own house," he says. "You gave me my freedom."

Thirty-four of Puppies Behind Bars' prisoner-trained animals work as guide dogs (above, Richards and Victoria near his home in Brooklyn). Eighteen others work as bomb-sniffing dogs, and seven more serve blind children as companions and as therapy dogs.

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Henry Graves and James Packard were two of the richest and most competitive men in the world in the 1920's and 1930's. Graves made millions in banking and railroads while Packard was crafting some of the most beautiful automobiles ever built. But in their genteel world of high society, they were at war. Their favorite competition…watch collecting. In 1927 Packard commissioned the world's most complicated watch but not to be outdone, Henry Graves surpassed his rival in 1933 with a single masterpiece. It took over 3 years to engineer this chronograph and only one original watch was ever built. It was held in the Museum of Time for years until it was recently auctioned off for the record price of over $11 million dollars at Sotheby's.

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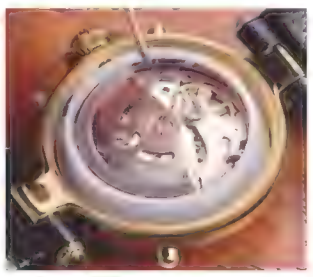

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In Search

Seven hundred years ago, William Tell shot an arrow through an apple on his son's head and launched the struggle for Swiss independence. Or did he?

BY ROBERT WERNICK

PHOTOGRAPHS BY ERIC SANDER

of William Tell

Swiss pilgrims have trekked to this waterside chapel (rebuilt in 1879) since the 1600s to see where William Tell (right) escaped his Austrian captors by pushing their boat back into Lake Lucerne's stormy waters. Tell's story is central to the Swiss sense of national origins.

IN THE CENTER OF THE TOWN SQUARE stands a heroic bronze figure, a stern, sturdy, bearded man in homespun clothes, crossbow over his shoulder, his arm around a barefooted boy. Before him stands another stern, sturdy man, this one in a neat business suit, respectfully silent, with his arm around another small boy, this one wearing Reebok running shoes. The man points to the ground. "This," he tells the boy, "is the spot."

The boy nods. He knows what spot this is: the birthplace of their country. He knows that the bronze statue is of William Tell, who with one shot of his crossbow started the centuries-long series of events that turned a few isolated settlements of poor, backward medieval mountaineers into the prosperous modern nation of Switzerland. He has heard the story of William Tell at his bedside and in the classroom. He has seen it on television and in comic books and acted out at country fairs and in school theatricals. He knows that here, many hundreds of years ago—in A.D. 1307, according to the statue's inscription—Tell, a local farmer and famous hunter, came striding with his son through the market square of Altdorf, then as now the only town of any size in the canton of Uri.

In the center of the town square those many years ago, bailiff Gessler, agent of the Hapsburg duke of Austria, placed a Hapsburg hat on a pole and, to the blare of trumpets, announced that all passersby must uncover their heads before it. But William Tell of Uri kept his hat on his head. He was promptly dragged before Gessler, who ordered an apple placed on the head of Tell's son and told the farmer that if he failed to shoot it off with a single arrow at a distance of 120 paces, both he and the boy would be put to death.

Tell paced off the distance, loaded and aimed his crossbow, shot his arrow, and the apple fell. "Your life is now safe," Gessler said to him, "but kindly tell me why I saw you putting a second arrow inside your jacket?"

"If my first arrow had killed my son," Tell answered, "I would have shot the second at you, and I would not have missed."

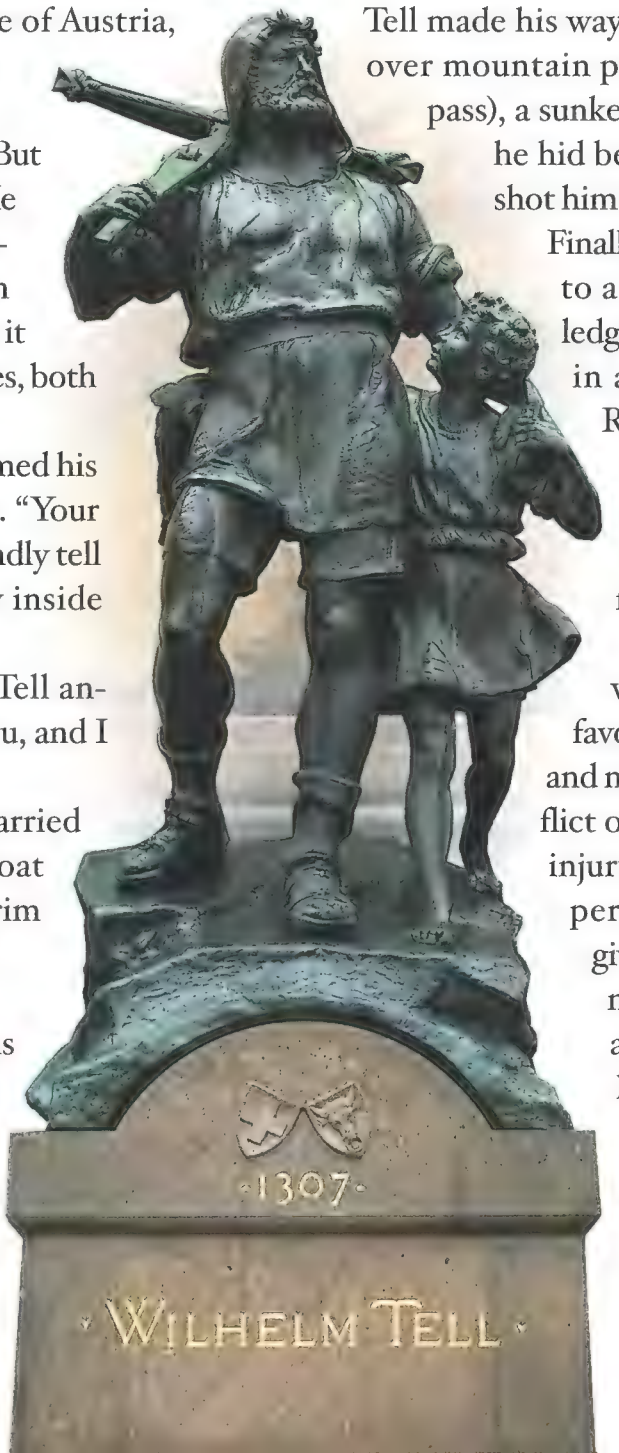
Enraged, Gessler ordered Tell bound, carried down to Lake Lucerne and thrown on a boat that would take him to a dungeon in the grim castle of Küssnacht. There, he declared, "You will never more see sun or moon."

Today, the square in Altdorf where all this took place is the first stop in a pilgrimage that takes contemporary Swiss fathers and sons, not to mention thousands of tourists of many nationalities, to the chapel built on the site of Tell's home in the village of Bürglen, then on to the landing where Gessler and his prisoner set off on the treacherous waters of Lake Lucerne. Next, a few miles to the east, visitors come to a spot on the lake's south shore where a steep path descends to a flat rock by the water's edge known as Tellsplatte—Tell's ledge. It was here that Tell, released from his bonds when a violent wind sprang up and he was the only man aboard with the strength to bring the boat to safety, steered close to the rock, leapt ashore and, with a mighty kick, sent Gessler and his crew back into the waves.

Calculating that the men would somehow reach shore, Tell made his way 20 miles through dark forests and over mountain passes to the Hohle Gasse (narrow pass), a sunken road leading to Küssnacht. There he hid behind a tree, waited for Gessler and shot him dead with that famous second arrow.

Finally, modern pilgrims return to the lake, to a bank on the shore opposite Tell's ledge. Here, after killing Gessler, Tell met in a forest meadow, known today as Rütli, with three other men from neighboring cantons who had been wronged by the bailiff or by other hired hands of the Hapsburgs. The four swore an oath, which Swiss boys know by heart: "To assist each other with aid and every counsel and every favor, with person and goods, with might and main, against one and all, who may inflict on them any violence, molestation or injury, or may plot any evil against their persons or goods." Then orders were given for mountaintop bonfires to signal the start of a war of national liberation and the destruction of castles like Gessler's, built by the Austrians to awe the natives.

Tell's story is cherished by the Swiss and central to their sense of origins—witness the image of Tell's



ROBERT WERNICK lives in Paris and has written a record 84 articles for SMITHSONIAN. *Photographer ERIC SANDER is based in Paris.*

TOP: AUSTRIAN ARCHIVES / CORBIS; P. 71 BETTMANN / CORBIS

crossbow stamped on every item of export that passes Switzerland's borders, as proof that it is truly made in Switzerland. The tale's popular celebration continues undimmed: this summer, for example, a special festival in and around Altdorf marks the 200th anniversary of the première of German dramatist Friedrich von Schiller's *William Tell*, a box office smash (directed on its opening night in March 1804 by Schiller's frien Johann Wolfgang von Goethe) that spread Tell's inspiration story far and wide.

There is just one small problem: many historians doubt tha Tell ever made those two famous arrow shots in 1307, and man are convinced that no such person as William Tell ever existe

For one thing, his story wasn't set down fully until 156 70, some 250 years after the events it describes, by historia Aegidius Tschudi, who, among other things, got his date wrong. In 1758, nearly two centuries after Tschudi's death, u turned a forgotten copy of the original Oath of Rütli mad by the representatives of the three forest cantons, none o whom was named Tell. It was dated "the beginning of Augus 1291," so the whole episode had to be moved back 16 yea (only Uri remains stubbornly faithful to the old date of 1307 Swiss Independence Day, established officially in 1891, is no celebrated with bonfires on August 1.

Also in the mid-18th century, a Bernese scholar name Gottlieb de Haller read, in an old history of Denmark, a tal involving King Harald Bluetooth, who reigned from 936 t

Tell was supposedly born in Bürglen (above) in the canton of Uri (below, the three forest cantons of central Switzerland). But his act of defiance against his Austrian overlords took place in the square of nearby Altdorf, where a statue marks the spot (opposite). His story was not written down fully until more than two centuries after it supposedly took place.

MIKE REAGAN

Visitors to Switzerland can hike down the Hohle Gasse, or narrow pass (left), where Tell purportedly shot bailiff Gessler with his second arrow, or trace Tell's exploits along the Swiss Path from Rütli to Brunnen. Swiss museums display numerous versions (above, from 1768) of Tell's tale, and he remains a fixture of popular culture (the billboard, inset, urges citizens to welcome refugees).

987, and a Viking chieftain named Toko. One drunken evening Toko boasted that he could do anything with his bow and arrow; he could even shoot an apple off a pike at the other end of the hall. "Good," said the king. "I will now place an apple on the head of your little son and you will shoot it off." There was no arguing with a king, so Toko took up his weapon, told the boy to look the other way and shot off the apple. When the king inquired why he had two more arrows inside his vest, Toko replied, "To kill you, sire, had I killed my son."

Bluetooth took the answer as perfectly normal for a Viking and forgot all about it. But Toko was not a man to forget or forgive and eventually joined the young crown prince Sweyn Forkbeard in revolt against his father. In the course of battle, he came across Bluetooth relieving himself behind a bush and put an arrow through his heart.

De Haller's subsequent book, *William Tell: a Danish Fable*, provoked outrage in Switzerland. There was a court action, a copy of the book was publicly burned in the Altdorf square once dominated by the tyrant's hat, and the author might have been set ablaze himself had he not made abject apologies, saying it was all just a literary exercise, not meant to be taken seriously.

But the door was now wide open for skeptics, and other scholars rushed in. They discovered there had been no organized uprising in the forest cantons after the Oath of Rütli, that the castles had been sacked either well before or well after 1291, and that, in fact, there was no documentary evidence that a man named William Tell had ever lived, let alone shot an apple off anyone's head. They concluded that Tell was a fictional character based on muddled memories or ancient legend. The most recent comprehensive history of Switzerland—a thousand-page tome published in 1988 in French, Italian and German—dismisses Tell in just 20 lines. (Even so, a bronze statue of a heroic Tell graces the book's cover.)

Jean-François Bergier, a former professor of history at Zürich's Swiss Federal Institute of Technology and author of what many consider the best Tell biography, *Guillaume Tell*, concedes that the apple story was likely imported from Scandinavia. But he insists that something very important did happen

TOP: SWISS NATIONAL MUSEUM, ZURICH

Seven centuries ago, representatives from three cantons vowed in Rütli (above) to "assist each other with aid and every counsel." In July 1940, facing a Nazi invasion, Swiss officers pledged there to defend the confederation and Swiss neutrality.

in the mountains of Uri, Schwyz and Unterwalden (the latter now split into Obwalden and Nidwalden) around the beginning of the 14th century. There, in a remarkable break with the past, was established the principle that a people could revolt against a great power and constitute themselves as a self-governing entity. And the Swiss federation founded at Rütli, or someplace like Rütli, in 1291 (or 1307) is still going strong after 700 years.

History did unquestionably turn around in those obscure gorges, although exactly how remains a matter of speculation and debate. The ancestors of the inhabitants of these forest cantons—among them Celts, Teutons, Helvetians, Burgundians—had come, in distant centuries, eastward or westward over the great plateaus north of the Alps in search of richer lands to cultivate or to loot, or in hopes of escaping the law. They pushed their way up the narrow Alpine valleys till they came up against sheer rock walls and settled down.

They lived in splendid isolation. Forced to cooperate among themselves, they elected officials at assemblies of landowners. As in mountain communities everywhere, they were bound by a common devotion to their own long-settled ways, and they presented a united front against foreigners on the other side of their mountains.

It all began to change, though, with the climatic warming trend that started around A.D. 1000. As the snow line receded, there was more pastureland and there were more cows to sell. The mountain men began looking for wider markets and found them just over the Alps in Italy. The St. Gotthard pass leading south was easy to navigate, but an impassable gorge blocked access from the north. Sometime in the mid-13th century, somebody—perhaps the men of Uri, who had learned to build sturdy houses on impossibly steep slopes—stretched a bridge across the gorge, changing the economic map of Europe. The St. Gotthard now offered the most convenient route between northern Europe and Italy, and all who traveled that way had to take a three-day journey through Uri, paying the men of the canton for food, shelter and the use of their mules.

But even as Uri was becoming more prosperous, it was torn by internal strife. In desperation, the community appealed, in 1257, to a neighboring nobleman, Count Rudolph von Hapsburg, to settle a feud among warring clans. Only too happy to oblige, Count Rudolph came with a glittering retinue, settled matters between the feuding clans and began poking his nose into everyone's business. Since his underlings wore the arms of the Hapsburgs and had soldiers to back them up, they soon came to feel that they owned the place. The people resisted, first sullenly, then violently.

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Still, more than 20 years passed after the Oath of Rütli before the Hapsburgs bothered to send an actual army to bring the insolent peasants to their senses and 60 years before they sent a second one. Each time, they came in great force, and each time they let themselves get caught in unfavorable terrain, where their gaudily armored knights were mowed down by the stolid, fierce mountaineers hurling boulders and wielding their pikes, battle-axes and crossbows.

It was enough to shake the world: a handful of rustic louts putting to rout one of the great powers of Europe. In time, more and more cantons, including those surrounding the thriving cities of Zürich, Bern and Basel, joined the confederation that came eventually to be known as Switzerland (a name derived from the little canton of Schwyz). No wonder the Swiss were proud of their exploits, and no wonder they listened eagerly to songs and stories about the courageous ancestors who had first won their freedom.

Above all, they listened to the story of a man named Tell, also known as Thall or Thaell or Tellen—the Wilhelm was added later—who had boldly kept his hat on in the square of Altdorf. Bergier speculates that the tale might have evolved thusly: a band of Danish pilgrims on their way to Rome might have been in an inn one night, listening to old favorite stories like the one about Bluetooth and Toko. Men of Uri might have been drinking there too, catching the drift of the tale about the apple on the little boy's head.

An apple on the head of a child! Here was the luminous detail that lit up for the simplest soul what life was like under the capricious cruelty of a foreign tyrant. Here was a story that perfectly illustrated how a stubborn, solitary man could stand up and fight back. The next time these men felt like passing on to their neighbors or their children the ever-popular, ever-evolving tale of Tell, it was easy to slip in the apple, which soon became the center of the parable and made Tell a living symbol of the national character: independent, capable, not to be pushed around.

Bergier sees Tell as a father figure the Swiss have created for themselves over the centuries, "a point of reference, unspoken but always present, to which the Swiss constantly attach themselves and in which they recognize themselves." As when a farmer in Altdorf, explaining the fierce opposition of the people of Uri to Daylight Saving Time, told me bluntly, "We live on Wilhelm Tell time."

The Swiss turn instinctively to Tell whenever they feel their country is in danger. In the past four centuries, they have had three civil wars, and in each of them both sides marched under the banner of William Tell. He inspired them in the dark days of World War II, when they were surrounded by the armies of a madman who regarded Switzerland as part of the German Reich.

Do Tell: Swiss children learn the saga from bedtime stories and oral tradition, but Hollywood has also done its bit to keep Tell alive (below, from top: Errol Flynn in *Adventures of William Tell*, The Three Stooges—Curly Howard, Larry Fine and Moe Howard—in *Phony Express*, Burt Lancaster in *The Flame and the Arrow* and Dean Martin and Jerry Lewis in a Tell-tale sketch).

In turn, Tell's influence and example have extended far beyond the nation's borders. Moved in part by his fight against their shared enemy the Hapsburgs, French revolutionaries named a street after him in Paris at about the same time they were beheading Queen Marie Antoinette, who had been born a Hapsburg princess. Schiller's play helped to stoke the fires of European liberalism and, later in the 19th century, provided an important symbol for the founding of Germany. When Rossini's 1829 opera *William Tell* was first produced at La Scala in Milan, the city was still part of the Hapsburg Empire, so the setting was changed discreetly to Scotland, and Tell and his son appeared wearing kilts. When the Nazis took power in Germany, casting themselves as the liberators of ethnic Germans in other lands, they made a movie glorifying Tell, with the mistress of Hermann Goering in a leading role. But when those same Nazis began invading other countries a few years later, Tell's story of liberation sent the wrong message, and they banned the production of any theatrical work about the Swiss hero, not least Schiller's play.

Movies and television spread the Tell legend further and wider still. In 1940, Hollywood produced an animated cartoon titled *Popeye Meets William Tell*, in which Popeye plays the son and has a can of spinach shot off his head. And for nearly 20 years, beginning in 1935, Rossini's heroic *William Tell* Overture introduced "The Lone Ranger," first on radio and later on television.

Perhaps the question of whether a man named William Tell actually lived in Uri 700 years ago is no more material than the question of whether a masked Lone Ranger actually roamed the Old West righting wrongs. If it is impossible to prove that Tell existed, it is equally impossible to prove that he didn't. Nobody can be sure if a man called Tell or Thall or Thaell or Tellen dared to disrespect the hat of a Hapsburg that day in 1291 or 1307. But for hundreds of years—and even today—anyone who takes a stand against thugs from the other side of the mountain can be sure that the spirit of William Tell stands with him.

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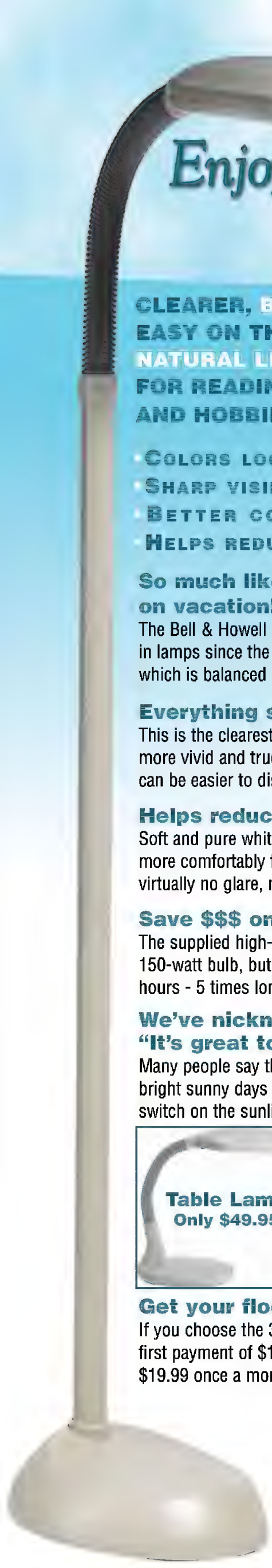

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"The street was all paved in asphalt," Hassam recalled of *Rainy Day, Columbus Avenue, Boston* (1885), "and I used to think it very pretty when it was wet and shining and caught the reflections of passing people and vehicles. I was always interested in the movements of humanity in the street."

Impressionism's

A new exhibition of works by Childe Hassam, a pioneering interpreter of the French style, highlights his "incorrigibly joyous" break with the past

BY DOUG STEWART

American Childe

In the summer of 1889, a 29-year-old American artist with an unusual name, Childe Hassam, rented a studio in Paris' Montmartre district. Littering the space were unsold canvases abandoned by the previous tenant—"*un peintre fou*," the concierge called him. The "mad painter" was Pierre-Auguste Renoir.

The young American had never heard of the artist, a leader of the French Impressionists, but he was intrigued by his work. "I looked at these experiments in pure color and saw it was what I was trying to do myself," he recalled 38 years later.

Hassam, who died in 1935 at age 75, was a pioneer of American Impressionism in the 1890s. Though he never studied formally with his French counterparts, he adapted their style to make vivid paintings of distinctly American subjects. His choice of contemporary scenes, from chicly dressed New Yorkers parading down Fifth Avenue to the weathered buildings and rocky coasts of New England, contrasted with American artists of the day, who preferred subjects from the past.

"Hitherto historical painting has been considered the highest branch of the art," Hassam said in an 1892 magazine interview, when he was 32. "A true historical painter, it seems to me, is one who paints the life he sees about him, and so makes a record of his own epoch."

Now some 150 works by the artist, praised in his lifetime as "a painter of light and air," are on view through September 12 at the Metropolitan Museum of Art in New York City. "Childe Hassam, American Impressionist" features oils, watercolors, pastels and prints culled from the painter's prodigious 50-year output.

Frederick Childe Hassam (he dropped his first name in favor of Childe, an uncle's surname) was born on October 17, 1859, in the town of Dorchester, Massachusetts, now a part of Boston. His mother, Rosa Delia Hathorne, shared an ancestor with novelist Nathaniel Hawthorne. His father, Frederick Fitch Hassam, a Boston cutlery merchant and antiques collector, claimed descent from a 17th-century English immigrant, whose name, Horsham, had been corrupted over time to Hassam (pronounced "HASS-um"). With his swarthy complexion and exotic-looking eyes, the artist was thought by many to be of Middle Eastern descent—speculation, it seems, he enjoyed stoking. In the mid-1880s, he took to painting an Islamic-looking crescent moon (later shortened to a slash) next to his signature, and he adopted the nickname Muley (derived from the Arabic *Mawla*, Lord or Master), after Muley Abul Hassan, a 15th-century ruler of Granada in Washington Irving's *Tales of the Alhambra*.

Hassam was a scrappy, athletic youngster. "I could swim across Dorchester Bay and knock out any of the other boys with my fists," he once claimed. After dropping out of high school at 17, he found work as a draftsman in a wood-engraving shop in Boston. An intricate panorama of Marblehead Harbor that he drew there still graces the editorial page of Marblehead's newspaper. By his early 20s, Hassam was contributing illustrations to *Harper's* and *Scribner's* magazines and attending art classes in his spare time. He was also producing a stream of unsentimental watercolors of country lanes and old houses that found ready buyers.

In February 1884, he married 22-year-old Kathleen Maud Doane, a family friend he'd courted for several years. The couple moved to Boston's stylish South End, newly built over swampland along the Charles River. There Hassam created a series of densely detailed, naturalistic paintings of the wide boulevards and elegant brownstones around him, using dra-

"I believe the man who will go down to posterity is the man who paints his own time and the scenes of every-day life around him," wrote Hassam (above, in his New York City studio, c. 1896). His 1888-89 *Geraniums* (opposite) included a portrait of his wife, Maud, in a friend's garden outside Paris. The painting was shown as *Soleil et fleurs* in the Paris Salon exhibition of 1889.

CARNEGIE MUSEUM OF ART, PITTSBURGH, PA; PP. 88, 89 TOLEDO MUSEUM OF ART

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matic, plunging perspectives and subtle atmospheric effects: a sunset filtering through trees, the softening glow of a fresh snowfall, or—his trademark—shimmering, rain-soaked pavements. "Hassam loved rain, but it's never raining very hard," says H. Barbara Weinberg, curator of the Metropolitan Museum show. "Life is too pleasant for that. The sun is always ready to break through."

Attempting to make art out of urban streetscapes was highly unorthodox in the 1880s. "There were virtually no Boston artists painting this kind of thing at the time," Weinberg says. In fact, for many Americans after the Civil War—artists, critics and collectors alike—the only fitting subjects were to be found in distant lands or eras, if not atop Mount Olympus itself. "American life is so unpaintable," a French-trained American painter, Theodore Robinson, wrote a friend in 1883 (though he would later change his mind). "I would like to try a little flight into something Biblical or Mythological." The hordes of young Americans who journeyed to Europe in the late 19th century to study painting favored studio compositions of heroic warriors or allegorical females painted in fastidious detail and with great technical polish.

In 1886, Hassam, too, began a three-year stay in Paris. At first, he and Maud lived in a decidedly un-Bohemian, five-room apartment with a large attached studio on the Boulevard Clichy, overlooking the Opera. "They considered themselves a very proper French family," says Weinberg of the couple, who never had children. "They even had a French maid!" Hassam enrolled at the renowned "petit atelier" of the Académie Julian. At 27 he was older and more self-assured than most of the other Americans. "The moment I entered the . . . atelier, my eye lit on Hassam," a fellow student recalled. "I said to myself, 'There is a man to look out for. . . .'" Hassam devoted himself, he wrote a friend, to "drawing like a slave," but found the academy atmosphere to be "the personification of routine." The emphasis on contrived scenes, he said, "crushes all the originality out of the growing men. It tends to put them in a rut and keep them in it." That spring, Hassam took his easel to the streets of Paris.

At first, his outdoor paintings were a continuation of what he'd done in Boston: candid, rainy-day scenes of carriages and pedestrians rendered with confident polish. One of these, the immense *Une Averse—rue Bonaparte*, won a spot in the prestigious Paris Salon exhibition in 1887—a coup for a foreigner of any age. But a critic for the *Boston Transcript* wondered if it wasn't time for him to "come in out of the rain."

Perhaps Hassam heeded the barb. More likely, he was influenced by the vibrant, light-filled work of the Impressionists, who had mounted their eighth and final exhibition in Paris the previous year. In paintings such as *Grand Prix Day* (1887) and *Geraniums* (1888-89), Hassam demonstrated looser brushwork and a brighter palette than ever before. The paintings also foreshadowed his later reputation as a master of sunlight and shade. In 1919, the *New York Times* would write that Hassam knew "how to drench [his outdoor scenes] with light and give them air to breathe."

From Paris, he shipped paintings to exhibitions back home. Before an auction of his work in Boston in 1887, which he called "a matter of life and death" financially, he arranged to give several favored American critics small oils as gifts, along with notes angling for positive reviews.

"One of the things we've discovered is how commercially driven Hassam was," says Weinberg. "He showed paintings everywhere, from New York to Nebraska and points west—small exhibitions, large exhibitions. He never had a personal fortune. He never taught, and he never took on portrait commissions. He had to rely on the sale of his works."

Satisfied he'd learned all he could in Paris, Hassam, who was about to turn 30, and his wife set sail for the United States in October 1889. The couple settled in New York City, the epicenter of America's Gilded Age. "He became the unrivaled chronicler of New York," Weinberg says. "As in Boston and Paris, he was the artist of the avenues." He kept a succession of studios on or near Fifth Avenue and seldom traveled more than a few blocks to paint. Sometimes he worked from a window or balcony, but often he sketched the

Hassam, and his wife, Maud (ages 67 and 65, at the opening of his 1927 retrospective at the American Academy of Arts and Letters in New York City), were married for 51 years. Hassam wrote to an artist friend that Maud was his "business manager, legal adviser and wife all in one." She was also his model, posing for many of his paintings, particularly garden and interior scenes.

COLLECTION OF THE AMERICAN ACADEMY OF ARTS AND LETTERS, NEW YORK CITY

PENNSYLVANIA ACADEMY OF THE FINE ARTS, PHILADELPHIA

In his *Cat Boats, Newport* (1901), Hassam ignored the opulent new "cottages" along the city's cliffs in favor of the old part of town near the harbor with its white, towering Trinity Church.

passing crowds at street level from a parked carriage, using the opposite seat as his easel. "There is nothing so interesting to me as people," he remarked in 1892. "I am never tired of observing them in every-day life, as they hurry through the streets on business or saunter down the promenade on pleasure. Humanity in motion is a continual study to me."

Not all humanity, however. Only two years before, the Danish-born social activist and photographer Jacob Riis had published his searing exposé of tenement life, *How the Other Half Lives*, but Riis and Hassam might as well have lived on different planets. "Hassam was always depicting the social set that would buy his paintings," says Weinberg. "There's no hint that there was a heterogeneous, struggling population in his cities, whether Boston, Paris or New York. Instead, you see a genteel, optimistic view of urban life."

A frequent contributor, DOUG STEWART *wrote about Salem, Massachusetts' Peabody Essex Museum in the June 2004 issue.*

In the 1890s, Hassam—with his informal compositions, energetic brushwork and deft mosaics of pure color—became American Impressionism's most prolific and successful practitioner. But Hassam identified himself only grudgingly as an Impressionist, and then only in the sense, he said, that he painted "impressions" of what he observed. "The true impressionism is realism," he declared in 1892. He had little use for theory. "I can only paint as I do and be myself," he told a critic in 1901. "Subjects suggest to me a color scheme and I just paint."

Whatever the label, Hassam's 1890s paintings were decidedly avant-garde for America. Many critics and collectors still preferred the deep brown shadows and rich golden-hued light of the old masters—the "molasses and bitumen school,"

Hassam, who loved summers outdoors, relished the rocky landscape of a group of islands off the coast of Maine and New Hampshire. *Surf, Isles of Shoals* is from 1913, when he was 53.

Hassam called the style. "The sort of atmosphere they like to see in a picture they couldn't breathe for two minutes," he said of critics. Reviewing Hassam's first major one-man show in New York City, a writer for the *New York Sun* in 1896 praised his "artistic feeling and dashing manner," then complained: "His key of color has been rising higher and higher until it simply screeches." The show was a disaster. *Geraniums*, the exquisite painting that had helped Hassam earn a medal at the centennial Salon in Paris seven years before, sold for just $115 (about $2,500 today).

Summers in New England offered solace from such rebukes. He was drawn especially to picturesque spots with artists' colonies, such as Provincetown, Gloucester and Maine and New Hampshire's Isles of Shoals, which provided him with galleries to exhibit his work and plenty of plein-air painting companions. Hassam was a regular at a slightly run-down boardinghouse-*cum*-salon in Old Lyme, Connecticut, run by Miss Florence Griswold, the art-loving daughter of a sea captain. The painter found Old Lyme, he said, "just the place for high thinking and low living." Landscape painter and friend Henry Rankin Poore recalled bicycling through the outskirts of town and hearing what he took to be the wing beat of a partridge. Dismounting, he discovered Hassam standing bare-chested at his easel in a field, pounding on his chest, Poore said, "for warmth and health."

In New England, Hassam produced what would be among his most popular and critically admired works, notably seascapes and portraits of old houses and historic churches. "For urban Americans during this period," says Weinberg, "New England was a place to seek spiritual reassurance because it was the American bedrock, literally." The best-loved of these paintings are those he did on austere, rocky Appledore Island, just off the New Hampshire coast, which he and his wife visited over a 30-year period beginning in 1886. A small but exuberant cutting garden that their hostess, poet and innkeeper Celia Thaxter, somehow kept alive amid the rocks and salt spray inspired Hassam to paint a series of vivid oils and watercolors. Seeing these paintings, one critic wrote,

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was "like taking off a pair of black spectacles that one has been compelled to wear out of doors, and letting the full glory of nature's sunlight color pour in upon the retina."

Hassam was pleased in 1899 when the Cincinnati Art Museum bought *Pont Royal*, an airy view of the Seine he had painted from a Paris hotel window two years before, his first sale to a museum. But he continued to disdain the staid, Eurocentric taste of the New York City art establishment and the dull canvases of those he dismissed as his "contemptuaries." In 1897, he and his close friend J. Alden Weir organized a breakaway group to mount its own exhibitions. They called themselves Ten American Painters, which became "the Ten." Hassam showed paintings in every one of the group's annual exhibitions between 1898 and 1919. "His output was tremendous," says the Metropolitan's Weinberg. She estimates he produced more than 2,000 oil paintings, pastels and watercolors, plus some 400 prints in his lifetime. A critic for the *New York Daily Tribune* suggested in 1911 that Hassam's work was uneven because there was so much of it. "Energy like his (and he brims over with it) is perhaps unnecessarily wayward: it has its lucky and its unlucky moments."

In New York in the early 1900s, Hassam, then in his 40s, had begun painting softly lit interiors with elegantly clothed female models posing meditatively next to curtained windows. Though the series seems contrived today, collectors and museums eagerly bought the works. J. Alden Weir reported to a mutual friend in 1907 that their old pal Muley, then 47, "has sold more pictures this winter, I think, than ever before and is really on the crest of a wave."

By the time the watershed 1913 Armory Show introduced modernism to New York City, Hassam, who contributed six paintings to it, had joined the Old Guard, serving on prize juries and advising museum directors. At an artists' club dinner in 1916, *Vanity Fair* editor Frank Crowninshield playfully introduced Hassam and Weir, then 56 and 64, respectively, as "the mammoth and the mastodon of American art."

At this point, Hassam and his wife were living in a spacious apartment with floor-to-ceiling windows overlooking West 57th Street. His best work seemed behind him, but the view of the bustling thoroughfare below may have inspired what became his most memorable burst of creativity. During World War I, New York City was the venue for a series of patriotic parades, and the canyons of Manhattan were filled with flags and bunting. Hassam, a fervent nationalist, painted more than two dozen images of flag-draped streets. In the later works in this series, the sunlit flags' geometric blocks of color dominated the oversize canvases, and pedestrians became mere smudges of paint. "The visual excitement of these parades probably stirred him to do finer things than he otherwise would have done," says Los Angeles County Museum of Art curator Ilene Susan Fort. "He was almost 60, but he was so enthusiastic about using his paintings to support the war effort, it was as if he was on a several-year adrenaline high."

Whether rendering picturesque vistas on Appledore Island (below, *Celia Thaxter's Garden*, 1890) or patriotic parades in Manhattan (opposite, *The Fourth of July, 1916*), the artist, wrote a critic for the *New York Times* in 1919, knew how to drench his paintings "with light and give them air to breathe."

Toward the end of the war, Hassam was sitting in Riverside Park sketching a transport ship at anchor in the Hudson, when a patrolman nabbed him on suspicion of being a German spy. The artist, who had called wartime Germans "hell-breathing hyenas" in a 1916 letter to a Boston newspaper, was apparently amused by the incident. After producing his bona fides at the precinct house, he commended the arresting officer for his vigilance.

In 1919, Hassam and his wife bought an 18th-century house in East Hampton, Long Island, where, over several summers, he would rise at daybreak to paint. His new works sold steadily, even if critics were unenthusiastic. Hassam claimed an income of $100,000 "from his brush" in 1920 alone.

Hassam's pronouncements on art and the art world turned ever more caustic as he aged. By 1932, most critics were "dolts, asses, dullards," excepting the few who praised his work. "As he got older and crankier, his Yankee pride at times morphed into an unfortunate bias against foreigners," says Weinberg. At 73, Hassam was referring to modernist painting as "Ellis Island art" foisted on the public by conniving foreign dealers.

By 1934, Hassam, then 75, was in declining health. Against a doctor's advice, he continued to swim in the cold Atlantic surf at East Hampton, stopping only with the first autumn frost. By April 1935, he was so frail that he needed an ambulance to convey him from Manhattan to his Long Island home, where he died on August 27 of undisclosed causes. His will directed that income from the sale of his unsold paintings—more than a million dollars' worth—go to New York's American Academy of Arts and Letters to help museums buy the work of living North American artists.

Although Hassam the man could be disagreeable, Hassam the artist was "incorrigibly joyous," wrote a *New York Times* critic in 1919. "The sun shines for him on rainy days, and his war pictures are flag pictures in all the colors of the rainbow."

METROPOLITAN MUSEUM OF ART, NEW YORK

PRIVATE COLLECTION

MAKING COPIES

At first, nobody bought Chester Carlson's strange idea. But trillions of documents later, his invention is the biggest thing in printing since Gutenberg

BY DAVID OWEN

PHOTOILLUSTRATION BY WILLIAM DUKE

COPYING IS THE ENGINE OF CIVILIZATION: culture is behavior duplicated. The oldest copier invented by people is language, by which an idea of yours becomes an idea of mine. The second great copying machine was writing. When the Sumerians transposed spoken words into stylus marks on clay tablets more than 5,000 years ago, they hugely extended the human network that language had created. Writing freed copying from the chain of living contact. It made ideas permanent, portable and endlessly reproducible.

Until Johann Gutenberg invented the printing press in the mid-1400s, producing a book in an edition of more than one generally meant writing it out again. Printing with moveable type was not copying, however. Gutenberg couldn't take a document that

Chester Carlson (left) persisted against the odds to develop xerography, a tool that would be crucial to the Information Age.

already existed, feed it into his printing press and run off facsimiles. The first true mechanical copier was manufactured in 1780, when James Watt, who is better known as the inventor of the modern steam engine, created the copying press. Few people today know what a copying press was, but you may have seen one in an antiques store, where it was perhaps called a book press. A user took a document freshly written in special ink, placed a moistened sheet of translucent paper against the inked surface and squeezed the two sheets together in the press, causing some of the ink from the original to penetrate the second sheet, which could then be read by turning it over and looking through its back.

Copying presses were standard equipment in offices for nearly a century and a half. (Thomas Jefferson used one, and the last president whose official correspondence was copied on one was Calvin Coolidge.) The machines were displaced, beginning in the late 1800s, by a combination of two 19th-century inventions: the typewriter and carbon paper.

Among the first modern copying machines, introduced in 1950 by 3M, was the Thermo-Fax, and it made a copy by shining infrared light through an original document and a sheet of paper that had been coated with heat-sensitive chemicals. Competing manufacturers soon introduced other copying technologies and marketed machines called Dupliton, Dial-A-Matic Autostat, Verifax, Copease and Copymation. These machines and their successors were welcomed by secretaries, who had no other means of reproducing documents in hand, but each had serious drawbacks. All required expensive chemically treated papers. And all made copies that smelled bad, were hard to read, didn't last long and tended to curl up into tubes.

None of those machines are still manufactured today. They were all made obsolete by a radically different machine, which had been developed by an obscure photographic-supply company. That company had been founded in 1906 as the Haloid Company and is known today as the Xerox Corporation. In 1959, it introduced an office copier called the Haloid Xerox 914, a machine that, unlike its numerous competitors, made sharp, permanent copies on ordinary paper—a huge breakthrough. The process, which Haloid called xerography (based on Greek words meaning "dry" and "writing"), was so unusual and nonintuitive that physicists who visited the drafty warehouses where the first machines were built sometimes expressed doubt that it was even theoretically feasible.

"The letters came out clearly," Carlson recalled of the first xerographic copy, which he made with his assistant Otto Kornei in a rented room in New York City on the date shown.

Remarkably, xerography was conceived by one person—Chester Carlson, a shy, soft-spoken patent attorney, who grew up in almost unspeakable poverty and worked his way through junior college and the California Institute of Technology. He made his discovery in solitude in 1937 and offered it to more than 20 major corporations, among them IBM, General Electric, Eastman Kodak and RCA. All of them turned him down, expressing what he later called "an enthusiastic lack of interest" and thereby passing up the opportunity to manufacture what *Fortune* magazine would describe as "the most successful product ever marketed in America."

Carlson's invention was indeed a commercial triumph. Essentially overnight, people began making copies at a rate that was orders of magnitude higher than anyone had believed possible. And the rate is still growing. In fact, most documents handled by a typical American office worker today are produced xerographically, either on copiers manufactured by Xerox and its competitors or on laser printers, which employ the same process (and were invented, in the 1970s, by a Xerox researcher). This year, the world will produce more than three trillion xerographic copies and laser-printed pages—about 500 for every human on earth.

Xerography eventually made Carlson a very wealthy man. (His royalties amounted to something like a 16th of a cent for every Xerox copy made, worldwide, through 1965.) Nevertheless, he lived simply. He never owned a second home or a second car, and his wife had to urge him not to buy third-class train tickets when he traveled in Europe. People who knew him casually seldom suspected that he was rich or even well-to-do; when Carlson told an acquaintance he worked at Xerox, the man assumed he was a factory worker and asked if he belonged to a union. "His real wealth seemed to be composed of the number of things he could easily do without," his second wife said. He spent the last years of his life quietly giving most of his fortune away. When he died in 1968, among the eulogizers was the secretary-general of the United Nations.

CHESTER CARLSON WAS BORN in Seattle in 1906. His parents—Olof Adolph Carlson and Ellen Josephine Hawkins—had grown up on neighboring farms in Grove City, Minnesota, a tiny Swedish farming community about 75 miles west of Minneapolis. Olof was a barber. He suffered severely from arthritis in his spine, and he developed tuberculosis in his 30s. Seeking relief, he moved his wife and 3-year-old son to a brother's house in California, then to a camp among sand dunes in the Arizona

Adapted from *Copies in Seconds: How a Lone Inventor and an Unknown Company Created the Biggest Communication Breakthrough Since Gutenberg—Chester Carlson and the Birth of the Xerox Machine* by David Owen (Simon & Schuster). © 2004 David Owen.

XEROX CORP ARCHIVES

As a boy in the 1920s, Chester filled his diary with ideas for inventions, such as a rotating billboard, a machine for cleaning shoes and a trick safety pin.

desert, then to an adobe hut on a worthless Mexican farm, then to Los Angeles—where the family spent more than a year living in a single room in the home of a doctor for whom Ellen, now the family's sole financial support, worked as a housekeeper—then to a dilapidated rented house in San Bernardino. In the fall of 1915, when Chester was 9, Olof decided that cold, rather than heat, might improve his health, and he moved the family again, to a decaying shed in the mountains outside San Bernardino. The snows that winter were three and four feet deep. Each morning, Ellen used a hand mirror to flash a signal to a worried storekeeper in the valley below, to let him know that they had survived another night.

Young Chester knew his father only as an invalid and would remember him as "a bent walking skeleton, who had to spend the greater part of his time lying flat on his back." Chester, an only child, also said his mother had always somehow managed to make the family's poverty seem like a game—a challenging puzzle that could be solved with good spirits and ingenuity. Nevertheless, he had a very lonely childhood. During most of the time the family lived in the mountains, he was the only student in the local school. This period, he said, "marked the beginning of a considerable setback in my social development among children of my age." When the school year ended, Olof—who had now abandoned all hope of improving his health—moved the family back into the valley, where, for the next eight years, they lived in a grim succession of rundown houses.

By the time Chester entered high school, he was his family's principle provider. Still, he managed to make good grades, especially in science, and began to think seriously about how he might use his talents. He considered gold prospecting, publishing and other occupations before deciding his best chance would be to invent something valuable.

At 15, Chester began jotting down ideas for inventions and making other notes in a pocket diary, a practice he maintained for the rest of his life. He sketched concepts for a rotating billboard, a machine for cleaning shoes and a trick safety pin (which could be made to look as though it had pierced a finger). He was fascinated by printing and the graphic arts. When he was 10, his favorite possession was a toy typewriter. Later, he worked in a print shop and published a magazine, the *Amateur Chemists' Press*, for science-minded classmates. "I was impressed with the tremendous amount of labor involved in getting something into print," he recalled in a 1965 interview with Joseph J. Ermenc, a Dartmouth professor. "That set me to thinking about easier ways to do that, and I got to thinking about duplicating methods."

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During his junior year in high school, his mother—his one source of happiness, encouragement, stability and love—died of tuberculosis, at 53. Her death devastated him; 25 years later, he was almost physically unable to speak of it. "The worst thing that ever happened to me," he recalled. "I so wanted to be able to give her a few things in life." By the time he graduated from high school, he and Olof had been reduced to living in a former chicken coop, whose single room had a bare concrete floor. Chester slept outdoors, partly to lessen his own chance of contracting the disease that had killed his mother, on a narrow strip of packed earth between the building and a board fence that ran along the alley, in a sleeping bag that he himself had made.

The 1949 prototype required four dozen manual operations to make a copy in three minutes. It almost sank the company.

Carlson worked his way through three years at a nearby junior college, then transferred to Cal Tech, where he majored in physics and supported himself and his father by mowing lawns, doing odd jobs and working at a cement mill. (His father, with whom he shared a small apartment, in Pasadena, pitched in by doing the cooking.) He graduated in 1930 and was hired by Bell Labs, in New York City, as a research engineer. After a year, he transferred to the company's patent department, believing the skills he would learn

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there might be useful to him when he became an inventor.

In his notebooks during the 1930s, Carlson recorded more than 400 ideas for products, among them a raincoat with gutters to channel water away from trouser legs; a toothbrush with replaceable bristles; a see-through toothpaste tube, made of cellophane; a perforated-plastic filter tip for cigarettes. In 1934, he married Elsa von Mallen, who had given him her telephone number after dancing with him to Duke Ellington records at a party at the YWCA. The marriage was troubled almost from the beginning. "I don't know what to do or say—he's so much smarter," she said shortly before they divorced, in 1945. Partly to get out of the house, Carlson enrolled in night classes at New York Law School in 1936. He did most of his studying at the New York Public Library, where he copied by hand long passages from law books that he couldn't afford to buy. His copying gave him writer's

Fortune magazine called the Xerox 914, introduced in 1959, "the most successful product ever marketed in America."

cramp and made him think again about the desirability of a device that, unlike carbon paper, could be used to reproduce documents that already existed.

"I recognized quite early that if conventional photography would have worked for an office copier it would have been done before by the big companies in the photographic field who certainly would have explored that possibility pretty thoroughly," he told Ermenc. "So I deliberately turned away from the conventional photographic processes and started searching in the library for information about all the different ways in which light will affect matter. I soon came upon photoelectricity and photoconductivity."

Photoelectricity is such a complex phenomenon that it took Albert Einstein to explain it, in 1905; he was awarded the Nobel Prize in 1921 for having done so. (Incidentally, Einstein, like Carlson, was a physicist who worked in a patent office.) A photoconductive material is one whose ability to conduct electricity increases when light shines on it. Carlson reasoned that he might be able to make a copying machine based on photoconductivity if he could find a material that acted as a conductor when it was illuminated and as an insulator when it was not. His plan was to apply a thin layer of the material to an electrically grounded metal plate. Then, in the dark, he would apply a uniform static electric charge to the entire coated surface. Next, he would project an image of a printed page onto the charged surface, thereby causing the charge to drain away to ground from the illuminated areas (the ones corresponding to the reflective white background of the page) while allowing the charge to persist in areas that remained dark (the ones corresponding to the black ink). Finally, he would dust the entire surface with an oppositely charged powdered toner, which would adhere only to the places where charges remained, thereby forming a visible (and reversed) image of the original page. The powder could then be transferred to a sheet of paper and fused to it: a copy.

This idea would become the basis of xerography. Every xerographic office copier and laser printer contains a photoconductive surface, which is known as the photoreceptor. (In a laser printer, the light that shines on the photoreceptor is a digitally controlled laser beam.) Carlson applied for his first patent on October 18, 1937, and began conducting crude experiments. He had learned from his reading that sulfur had the photoconductive properties he was looking for, so he bought some at a chemical supply store and attempted to liquefy it by heating it over a burner on the stove in the kitchen of his apartment, in Queens. In nearly a year of experimentation, he accomplished little beyond setting his sulfur on fire, filling his apartment building with the smell of rotten eggs and angering his wife.

In 1938, he rented a laboratory and hired an assistant, an unemployed physicist named Otto Kornei, who had recently emigrated from Austria. Carlson's laboratory was really just the back room of a beauty parlor—it had previously served as a janitor's closet—but it had running water and a gas connection, and Kornei soon succeeded in applying a thin film of liquefied sulfur to zinc plates the size of business cards.

Working with Carlson one day soon afterward, he wrote the date and place—*10.-22.-38 ASTORIA*—on a glass microscope slide, turned out the lights and rubbed a sulfur-coated plate with his handkerchief to give it a static electric charge. As Carlson watched, Kornei placed the slide facedown against the plate and turned on a bright flood lamp for several seconds. He turned off the lamp, removed the slide and dusted the plate with powder. "The letters came out clearly," Carlson wrote later. Carlson pressed a piece of wax paper against the image so that most of the powder stuck to it. He was now holding the world's first xerographic copy. (That historic copy is in the Smithsonian's collection.) He gazed at the paper for a long time and held it up to the window. Then he took his assistant to lunch.

Kornei, unlike his boss, was unimpressed, and soon took

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At least half the staff thought xerography was a dumb idea. "It just goes to prove that if you've got something unique, you don't take a poll," said Dayton.

a job at an electronics company in Cleveland. Carlson continued alone and spent six years unsuccessfully trying to interest companies in developing and manufacturing the machine he had envisioned. In 1944, a chance conversation led him to the Battelle Memorial Institute, a private, nonprofit research-and-development organization in Columbus, Ohio. He performed his standard demonstration for a half-dozen of Battelle's scientists and engineers, then braced himself for the throat-clearing and paper-rearranging that was the usual response to his presentations. But a Battelle engineer named Russell Dayton held up the scrap of wax paper and said to his colleagues, "However crude this may seem, this is the first time any of you have seen a reproduction made without any chemical reaction and [with] a dry process." Battelle agreed to invest.

This was significant progress, although it was not the vindication that Carlson had dreamed of. Battelle allocated just $3,000 for xerographic research in 1944, and more than a few of its scientists remained doubtful for years to come. "Of those who knew about it," Dayton said later, "at least 50 percent thought it was a stupid idea and that Battelle should never have gotten into it. It just goes to prove that if you've got something unique, you don't take a poll."

Also in 1944, a New York City patent agent and freelance writer named Nicholas Langer came across a copy of one of Carlson's first patents and wrote a laudatory article about it for *Radio News*. A condensed version of the article appeared the next year in a technical bulletin published by Eastman Kodak and caught the attention of Joseph C. Wilson, president of the Haloid Company, which, like Kodak, was situated in Rochester, New York. For some time, Wilson had wanted to establish Haloid in a business that, unlike photographic supplies, wasn't already dominated by its powerful crosstown rival. Following a lengthy negotiation, in 1947 Haloid agreed to pay Battelle $10,000 for a one-year license to help the company build office copiers based on Carlson's idea, with options to renew. A quarter of the fee, or $2,500, went to Carlson—the first money he earned from his idea, which was now a decade old.

Success was not immediate. Haloid, with considerable help from Battelle, introduced its first xerographic copier, which it called the Model A, in 1949, but the machine was almost comically difficult to operate, and all the early testers returned it. "Awkward in its lack of co-ordinated design, it required more than a dozen manual operations before it would produce a copy," Haloid's research chief wrote in 1971. That was an understatement; four dozen manual operations was more like it. With practice, Haloid promised, a skilled operator could hope to make a copy every three minutes or so. The Model A Copier was so hard to use that it might have sunk xerography, and possibly Haloid itself, if it hadn't turned out to be good at something else: creating inexpensive paper masters for offset lithographic duplicators, a type of printing press.

Developing a truly useful office copier took another ten years and many millions of dollars. Carlson became a Haloid consultant in 1948. Later, he was given a laboratory and an assistant, and he made a number of discoveries, for which he received three dozen patents. Still, Carlson's most important contribution to the project during the 1950s was probably helping to maintain the company's enthusiasm for his idea despite repeated setbacks. A Battelle engineer said later, "There always had to be something *extralogical* about continuing."

Haloid's physics team (George Mott, Fred Hudson, Harold Clark and Bob Gundlach c. 1956) toiled in an old house in Rochester.

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Haloid's final push to build an automated xerographic copier—the model 914—began in the early '50s. The main theoretical work was done by a group of young physicists, who worked not in a gleaming laboratory but in an old house in a seedy part of town. Robert Gundlach, who went to work at Haloid in 1952 and eventually earned 155 xerography-related patents, told me not long ago, "You had to park about a block away and walk. They put Ernie Lehmann and me up in the attic, in a room that had a ceiling that sloped so that you couldn't stand up except in the middle of the room. There was a group working on powder-cloud development, which involved making a fog of submicron carbon particles. Every once in a while we would have to vent the developing device, because it would become clogged with carbon dust, and we had to learn not to do that on Tuesdays, because that

was when the lady next door hung out her white linens."

The company's engineers scrounged bolts, springs, aluminum tubing and other items from a junkyard. An early prototype was eventually able to make copies—though only in the dark, since it had no exterior cabinet to prevent the room's lights from discharging the photoreceptor and spoiling the images—but it looked more like a science fair project than an office machine.

A photoreceptor has to be cleaned between exposures. In the Model A—in which the photoreceptor was a flat plate coated with selenium, a far more sensitive photoconductor than sulfur—the cleaning was done manually, by rocking the plate in a tray filled with what was essentially cat litter. (Coffee grounds, soybean meal, flax seed and corn meal were also tried and rejected—they attracted vermin.) In a 914, the photoreceptor was a cylinder and the cleaning was done by a rotating fur brush.

That Haloid thought of using fur may have had more to

"I feel somewhat at loose ends at present," said Carlson (with wife, Dorris, in 1965), before he started giving away his millions.

do with chance than with science: some of the company's researchers and engineers in those days worked in a bleak, tenement-like brick building on Lake Avenue whose ground-floor storefront was occupied by the Crosby Frisian Fur Co. The engineers tried and rejected beaver and raccoon, then determined that the back fur of New Zealand rabbits worked just about right. The brushes were handsewn by the father of the fur shop's owner. The engineers trimmed them to size on a homemade machine that looked a little like a reel lawn mower.

In the winter of 1959, the company rented a grim warehouse on Lyell Avenue and built a few final 914 prototypes there. The building's owner, to save money, turned the furnace down at five o'clock, so the engineers erected a canvas enclosure around each machine to contain the heat given off by the machine itself and worked inside, often around the clock. They and other Haloid employees were trying to identify and eliminate the 914's remaining defects, of which there were depressingly many.

One of the biggest challenges had to do with the toner—the powdered resin that's used to develop xerographic images. A toner has to have many seemingly mutually exclusive characteristics. It has to melt quickly and completely, but can't be so soft that it smears on the photoreceptor or so hard that it damages the surface; it has to be brittle enough to be capable of being ground to a fine powder to yield sharp, high-resolution images, but not so fine that it fouls the machine. And so on. "The problems are self-exacerbating once they begin," Gundlach told me. An ideal toner, the scientists realized, would have some of the same properties as ice, whose viscosity, as you warm it, doesn't change until the moment it turns into a liquid. Most thermoplastic resins, in contrast, pass through a gradient of states between solid and liquid, as chocolate does. No one knew whether a suitable resin existed.

A satisfactory toner was developed virtually at the last minute, primarily through the efforts of a Haloid chemist named Michael Insalaco, and the first production 914 shipped in March 1960. The customer was Standard Press Steel, a manufacturer of metal fasteners in Jenkintown, Pennsylvania. The machine weighed nearly 650 pounds and had to be delivered on a tilting dolly so that it could be angled through doors.

In the mid-1950s, Carlson had worried that few businesses might ever need to make as many as a hundred copies a day—the threshold, he felt, at which xerographic office copying would be economical. During the 914's development, Haloid's engineering department had speculated that very heavy users, at peak periods, might make five times that many copies in a day, or 10,000 a month. From the day the first 914 arrived in Jenkintown, though, Standard Press employees used it to make copies at several times the predicted maximum rate. Using a 914 was seductively easy, since there were no special papers or chemical developers, and all you had to do was push a button—and the copy itself provided positive reinforcement, because it didn't smell bad, curl up or turn brown. The numbers seemed inconceivable at first, but the first companies to receive 914s were turning out 2,000 to 3,000 copies a day.

Truly epochal technology shifts are sometimes incomprehensible until after they've occurred. When the first videocassette recorders were introduced, in the 1970s, the Motion Picture Association of America spent millions complaining to Congress that Hollywood was about to be annihilated. Instead, the VCR revived Hollywood by generating billions in rental fees and transforming the way movies were financed. Xerox machines had a similarly sweeping impact. Office workers didn't realize how much they needed copies until, in 1960, they were suddenly able to make them easily. The technology itself created the demand that ultimately sustained it. Invention was the mother of necessity.

XEROX CORP ARCHIVES

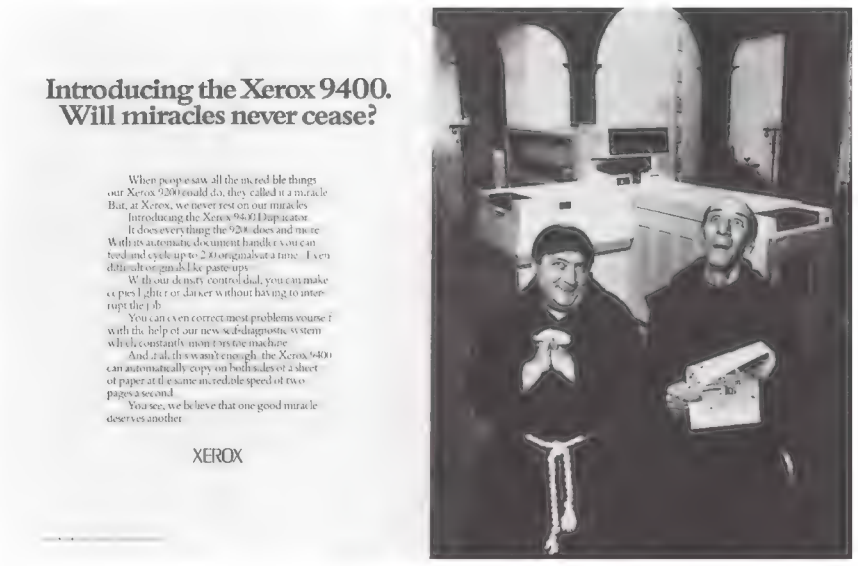
He came to terms with his wealth by divesting himself of most of it. His philanthropy during his final decade was prodigious. It was also anonymous.

CHESTER CARLSON began earning royalties from xerography in 1947. The payments were small at first. In 1953, he traded his old Studebaker for a new one. The next year, he and his second wife, Dorris, whom he had married in 1946, built an unpretentious three-bedroom house just outside Rochester. Carlson eventually earned something like $200 million from his invention, but he lived in that house for the rest of his life. He sometimes told Dorris that he could be just as happy, or perhaps happier, living in a trailer in the yard. "I think he felt guilty about having a nice, comfortable house," she said later, "and when people would come in and say, 'Oh, this is lovely,' he would say, 'Dorris planned it all.'" She was never certain how truly serious he was about his trailer, but he mentioned it frequently, and she would tease him when he did: "And will you take your 13 steel filing cabinets with you?"

Carlson came to terms with his wealth by divesting himself of most of it. His philanthropy during the final decade of his life was prodigious. It was also entirely anonymous. When he gave the money to build a building, he did not permit his name to be revealed publicly, never mind be engraved in stone above the door. In the mid-1960s, for example, he gave money to Cal Tech for a center for the study of chemical physics, his field of concentration, but stipulated that the building be named for Arthur Amos Noyes, the professor whose teaching had influenced him the most. Carlson made large contributions to organizations that promoted world peace. He supported civil rights organizations. He bought apartment buildings in Washington, D.C. and New York City and arranged for the buildings to be racially integrated. He gave millions to the United Negro College Fund and made contributions to individual black colleges. He (and his will) provided most of the funding during the '60s and '70s for Robert Maynard Hutchins' Center for the Study of Democratic Institutions. He supported the Fellowship of Reconciliation and other pacifist organizations. He gave money to schools, libraries and international relief agencies. The list of his beneficiaries was long, and he himself weighed every request. (His philanthropy continues today, through the Chester and Dorris Carlson Charitable Trust.)

Carlson died, of a heart attack, on September 19, 1968. He was 62. U Thant, the secretary-general of the United Nations, who had been a friend of Carlson's, wrote at the time, "To know Chester Carlson was to like him, to love him and to respect him. He was generally known as the inventor of xerography, and although it was an extraordinary achievement in the technological and scientific field, I respected him more as a man of exceptional moral stature and as a humanist. His concern for the future of the human situation was genuine, and his dedication to the principles of the United Nations was profound. He belonged to that rare breed of leaders who generate in our hearts faith in man and hope for the future."

In the nearly seven decades since Chester Carlson thought of xerography, no one has come up with a better way of making copies on plain paper. That is an almost inconceivable achievement, given the usual pace of high-technology innovation, evolution and extinction. The number of copies made all over the world on xerographic machines has increased every year since Carlson and Kornei peeled away that first scrap of wax paper in Astoria back in 1938. In 1955, four years before the introduction of the 914, the world made about 20 million copies, almost all of them by non-xerographic means; in 1964, five years after the introduction of the 914, it made nine and a half billion, almost all xerographically. Five hundred and fifty billion in


Introducing the Xerox 9400.
Will miracles never cease?
When people saw all the incredible things our Xerox 9200 could do, they called it a miracle. But, at Xerox, we never rest on our miracles.
Introducing the Xerox 9400 Duplicator.
It does everything the 9200 does and more. With its automatic document handler, you can feed and cycle up to 200 originals at a time. Even difficult originals like paste-ups.
With our density control dial, you can make copies lighter or darker without having to interrupt the job.
You can even correct most problems yourself with the help of our new self-diagnostic system which constantly monitors the machine.
And, if that wasn't enough, the Xerox 9400 can automatically copy on both sides of a sheet of paper at the incredible speed of two pages a second.
You see, we believe that one good miracle deserves another.
XEROX

From 1959 to 1966, tiny Haloid would grow into Xerox (a c. 1977 ad), the nation's 15th-largest publicly traded company.

1984. Seven hundred billion in 1985. This year, trillions.

And Carlson's invention is still evolving. One of the most advanced machines today is the Xerox DocuColor iGen3, introduced in 2001. It is a digital printing system rather than a copier but operates xerographically. It produces 6,000 full-color, 8-1/2- by 11-inch offset-quality impressions per hour, and those impressions can be customized on the fly. Its four "imaging stations" lay down cyan, magenta, yellow and black toners on an electrostatically charged photoconductive belt, from which the powders are transferred, all at once, onto paper. The underlying imaging technology, by which a monochromatic process makes full-color prints, is hard to explain, but essentially it involves separating a polychromatic image into the three complementary colors (plus black) in order to "enable one color to be recorded, and then developing with colored powder to produce a copy of that color, then repeating for each other color and superimposing the dust images on the same copy sheet."

That, at any rate, is how Chester Carlson described it in his second xerography patent, which he filed on April 4, 1939.

XEROX CORP ARCHIVES

AT 24 YEARS OF AGE, William Byrd III presided over a vast Virginia estate that included Westover, a prosperous tobacco plantation on the James River. He possessed a round face, soft eyes, immaculate public manners and a new toy—a horse named Tryal he had just imported from England. Byrd was also an insatiable gambler captivated by dice, cards, horse racing, billiards, backgammon, lotteries—anything an American colonist could bet on in 1752.

The young aristocrat wanted nothing more than to show off his

Off to the Races

Before the American Revolution, no Thoroughbred did more for racing's growing popularity than a plucky mare named Selima

BY JOHN EISENBERG

ILLUSTRATIONS BY WILLIAM H. WILSON JR.

"The most important race of the colonial era" (rendered by William Wilson for SMITHSONIAN), a four-mile contest in Virginia held in December 1752, was won commandingly by a remarkable Thoroughbred named Selima (above), who left her rivals in the dust and went on to greatness as a broodmare.

"I think he thought he was the wealthiest man in the world, and he certainly behaved that way," says Marion Tinling.

new horse and, at the same time, make a gambling score, the bigger the better. His flamboyant urges resulted in the first historically significant Thoroughbred horse race on American soil: an epic five-horse, four-mile contest on a hilly Tidewater loam known as Anderson's Race Ground, held before a noisy swarm of racing fans in Gloucester, Virginia, near Williamsburg, on December 5, 1752. It was "in many ways the most important race of the colonial era," according to John Hervey, an eminent racing historian from the first half of the 20th century. It also foretold the fortunes of two of its principals—Byrd himself and a remarkable Thoroughbred named Selima.

Byrd's grandfather had come to America from England around 1669 and parlayed an inheritance into a profitable fur-trading business. Byrd's father collected books and wrote witty poems and intimate diaries, founded Richmond, built a breathtaking Georgian mansion at his Westover plantation in Virginia and increased the Byrd fortune through land speculation before his death in 1744.

Young Byrd wanted to maintain the family's place in society, and he seemed well on his way. He was already a justice of the peace and had been elected to Virginia's governing House of Burgesses, following in his father's footsteps. He relished displaying his wealth, the more ostentatious the better. While commanding a military unit at a remote outpost several years later, he received a wagonload of wine, coffee, brandy, soap and chocolate, enabling him to maintain his abundant lifestyle in difficult circumstances.

"I think he thought he was the wealthiest man in the world, and he certainly behaved that way," says Marion Tinling, a historian who has studied the Byrd family correspondence.

Running a horse in an important race was, Byrd believed, yet another way to emphasize his prominence. "That was what the wealthy gentlemen of the day did: they raced their horses against each other and staked their reputations on it," says Ellen Moyer, the current mayor of Annapolis, Maryland, a racing center during the colonial era.

Neither Byrd's father nor his grandfather had raced horses, so the young aristocrat saw the Gloucester race as a chance to succeed on his own, apart from their enduring influence. But what he found more enticing was a chance to win money.

He had taken up gambling when his parents sent him to London to study law at age 18. Sheltered as a boy in Virginia—his schooling took place at home because his parents feared exposing him to smallpox—he cut loose mightily once he was on his own. There was a story that he had lost thousands of pounds to the Royal Duke of Cumberland in a single sitting at a West End club. As popular as gambling was among England's privileged, Byrd was smitten beyond reason.

When he returned to Virginia, he married the daughter of another wealthy tobacco planter, built a mansion on a hill near Richmond and started a family. When the mansion at Westover, where his mother still resided, was damaged in a fire, he rebuilt it with the finest materials and objects, including the most expensive billiards table in Virginia. But while he seemed the very embodiment of colonial gentry, sinister influences lurked inside. He would turn on his mother who doted on him, calling her "insane." And a French visitor to a Williamsburg tavern later wrote that Byrd was "never happy but when he has . . . Dices in hand." Gambling consumed him.

"He was an unfortunate man in many respects," says Tinling. "He had no head for business and didn't know how to manage his money. He didn't make very good friends. He didn't like his mother, who wanted the best for him. There was not a lot that went right."

After importing Tryal around 1752, Byrd issued a challenge that was audacious even by his standards: he would put up 500 Spanish pistoles, an outrageous amount, for any horse in the land to race against Tryal, with the winner taking the entire purse. He used Spanish currency, the backbone of the shipping trade, but the gamble was colossal in any coin. One pistole was the cost of a cow. Five hundred could furnish a mansion or buy a dozen slaves.

"The money on the table was phenomenal," says Stephen Patrick, director of the City of Bowie Museums, which include the Belair Mansion and the Belair Stable Museum in Maryland.

America in 1752 was a divided sprawl of Quakers and Puritans, Catholics and Dutch, Yankees and Southerners, Tories and slaves. More than a million people resided in what was still, in some ways, a brutal frontier, with disease claiming many children, Indians attacking the fringes, and pickpockets

With immaculate manners, refined taste and a seat in Virginia's House of Burgesses, Tryal's owner, William Byrd III (c. 1750), personified colonial gentry. Despite his blessings, he was "never happy," a contemporary noted, unless "he ha[d] . . . Dices in hand."

VIRGINIA HISTORICAL SOCIETY, RICHMOND, VIRGINIA

Selima (above at Ogle's Belair estate in Maryland) gave birth to ten foals after her racing career was finished. "Out of the ten, there was only one clunker in the bunch," says *Owner-Breeder International*'s Anne Peters. "She dominated the breeding of her time."

and horse thieves being put to death. But a sophisticated society was rapidly evolving as every year ships delivered more people and culture from England. There was theater to enjoy, newspapers to read and postal routes for the mail.

The population was still too far-flung and disparate to agree on much, especially independence, an idea just beginning to percolate. But colonists from Rhode Island to the Carolinas could all agree that nothing was more heavenly than a fast horse.

Racing in the New World dated to 1665, when New York's royal governor plotted a track on a Long Island plain shortly after the Dutch surrendered the territory. Until the 1720s, a typical race was a quarter-mile sprint between two horses, usually resulting from an argument between wealthy country gentlemen convinced they owned the faster horse. The men frequently rode their own horses, often grabbing and punching each other as they hurtled down narrow racing lanes surrounded by fans hurling bets back and forth. These bawdy affairs known as path races took place in front of taverns, on city squares or at country fairs. They were particularly popular in Virginia, Maryland and the Carolinas.

A more sophisticated sport known as course racing had already sprouted in England by the early 1700s. Queen Anne opened the royal track at Ascot, and other racecourses followed. The typical race became a longer contest—four miles was the classic distance—between groups of horses competing for money and trophies.

In the colonies, the sport soon took a similar evolutionary turn. America's first jockey club, composed of wealthy horse owners and breeders, was organized in Charleston, South Carolina, in 1734. Five years later, Williamsburg's *Virginia Gazette* heralded a race in which eight horses competed over a one-mile course, with a trumpeter's blast signaling the start and the winner earning 40 shillings.

In wealthy Annapolis, whose inhabitants, it was said, were more British than the British, the highlight of the social season was a week of parties and plays organized around a racing meeting. In 1743, a silversmith was commissioned to make a trophy for the Annapolis Subscription Plate, a premier event of the city's September races.

JOHN EISENBERG is the author of four books and is a sportswriter and columnist for the Baltimore Sun. *Artist WILLIAM H. WILSON JR. paints scenes from horse-racing history at his Maryland studio.*

Only wealthy colonists could afford to import Thoroughbreds from across the Atlantic. Above: Maryland governor Samuel Ogle observes the unloading of the first imported horses to Maryland, Queen Mab and Spark, at the Annapolis city dock in June 1747.

The prestige and money associated with racing success inspired breeders to try to produce speedier horses. British soldiers had long returned from desert battle fronts with stories of their opponents' astounding horses sprinting through the sand, so Middle Eastern sires were imported to England, leading to the foundation of a new breed, the Thoroughbred. At first known simply as blooded horses, these leaner, faster equines soon arrived in the colonies, attracting gawkers and vastly increasing interest in the sport. New oval tracks that gave spectators a better view further increased its appeal.

Only the wealthy could pay for a horse to take a three-month boat trip across the rough Atlantic, of course. Samuel Gist of Hanover County, Virginia, was the first on record to do it, bringing over Bulle Rock, a 21-year-old, in 1730. Bulle Rock was much too old to race, but Gist wanted him to sire a new generation of faster horses. Others who imported Thoroughbreds included Samuel Ogle, the royal governor of Maryland; Ogle's brother-in-law, Benjamin Tasker Jr., a young colonel in the militia serving Anne Arundel County, Maryland; and John Tayloe II, an avid horseman whose Mount Airy estate, in Richmond County, Virginia, later became a racing center.

Byrd wanted to be included in such company, but his judgment in horseflesh was flawed in one important regard: Tryal "had not been a success when raced" in England, according to John Hervey. The chestnut horse was also, at 10 years old, long past whatever prime he may have once enjoyed.

Byrd's challenge, as foolish as it was bold, attracted interest. Tayloe offered to put up a thousand pistoles and run two imported Thoroughbreds against Tryal. Another Virginian, Francis Thornton, entered a fast gray mare that had not been imported. Colonel Tasker sent word from Maryland that he would bring a mare named Selima. The race was thus worth 2,500 pistoles, an astonishing sum at a time when a race-winning horse typically earned about 30 pistoles.

Tasker's decision to enter Selima incited passions in Maryland, where horse owners and breeders believed their racing was superior to Virginia's, an attitude their neighbors loathed. The colonies had battled over many issues, including rights to the Chesapeake Bay, and Selima's entry took on sizable symbolic weight.

Like Byrd, Tasker was from society's pinnacle. His father was the mayor of Annapolis. His sister was married to Maryland governor Ogle. At 32, he was an Annapolis city council-

"Tasker accepted the challenge because he had faith in Selima and because his equine judgment, unlike Byrd's, was sound."

man and served in the upper house of Maryland's colonial legislature. If contemporary paintings are a guide, Tasker was distinctively handsome with high cheekbones, a sharp nose and trim build. He would later represent Maryland at the Albany Congress, where the idea of colonial unity was first broached. "He was a popular man, and very active in political life," says Shirley Baltz, a historian in Bowie, Maryland, who recently relocated to New Jersey.

But he was different from Byrd in that, as the grandson of a self-made man who came to America as an indentured servant, he did not take his wealth and comfort for granted. He had endured terrible despair—the deaths of five brothers before adulthood—and even his last name intimated a sense of purpose.

When Ogle died in 1752, leaving a 3-year-old son as his primary heir, Tasker and his father assumed responsibility for the boy. Unmarried and childless himself, Tasker moved into Ogle's sprawling country estate, known as Belair, 15 miles west of Annapolis. Some might have perceived this as opportunism, but Tasker's profits from the arrangement were minimal; he used his own money on major improvements that raised the value of the estate for his nephew, Benjamin Ogle, who would later gain control of the property and become governor of Maryland in 1778.

The *Maryland Gazette* described Tasker as "courteous . . . steady and sincere," and Benjamin Franklin, whom Tasker met at the Albany Congress, called him "amiable and worthy." Putting 500 pistoles on the line was not a decision to be made casually. But he accepted Byrd's challenge because he had faith in Selima and because his equine judgment, unlike Byrd's, was sound. At age 7, Selima was at the peak of her racing prowess. A bay mare with a faint white star on her forehead and a splash of white on her left hind ankle, she was the first preternatural talent to cross the Atlantic and race in the colonies.

"She was the whole package," says Anne Peters, a pedigree consultant who is also editor of *Owner-Breeder International*, an equine magazine, and co-founder of the Thoroughbred Heritage racing history Web site.

Selima's sire was one of three Middle Eastern horses that had started the Thoroughbred breed. Foaled in Yemen around 1724 and shipped through Syria and Tunisia, the stallion, known to history as the Godolphin Arabian, had found his way, the legend goes, to the royal stable of France's King Louis XIV. An Englishman named Edward Coke saw him in Paris, bought him and brought him back to England. After Coke died, the horse was passed on to Francis Godolphin, son of the lord treasurer to Queen Anne. Known as the Earl of Godolphin, Francis had a stud farm near the racing town of Newmarket.

The Godolphin Arabian was bred with the earl's finest mares, one of which, a bay later known as Shireborn, could be traced to Queen Anne's personal stable. Shireborn delivered Selima on April 30, 1745, at the earl's stud farm. Tasker, in England on an extended visit, bought her for an amount lost to history. There is no record of her racing in England before being shipped to Maryland in September 1750.

According to the earl's studbook, which was uncovered in the 1930s by C. M. Prior, an English pedigree expert, Selima was supposedly in foal—pregnant—when she was shipped across the Atlantic. "But there is no evidence that she produced a foal," Peters says. "She probably either lost it on the long trip across the Atlantic, or it died."

Selima was trained to race at Belair in 1751 and 1752. "It may well have been that they said, 'Well, she's not in foal, so let's just put her in training and see what happens,'" Peters adds.

Her racing debut was in Annapolis in May 1752. There, she defeated another English mare, Creeping Kate, winning 40 pounds, or about 50 pistoles. Her speed and heart were apparent. Described by Hervey as "one of those majestic matriarchs whose greatness is monumental," she was a more formidable racehorse than Byrd ever expected Tryal to encounter at Gloucester.

Her trip to the race was painstaking. Belair was almost 150 miles from Gloucester, and she likely walked the entire distance, led by a succession of stablehands. "A horse seldom rode in a cart to a race in those days; for the most part, they were walked," says Tom Gilcoyne, a former historian at the National Museum of Racing and Hall of Fame in Saratoga Springs, New York. The horses belonging to Byrd, Tayloe and Thornton also were walked, but their trips were shorter; they were stabled just a few miles from the course.

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Benjamin Franklin deemed Benjamin Tasker Jr. (above, c. 1752) both "amiable and worthy." Tasker became mayor of Annapolis after his horse, Selima, won a purse of 2,500 Spanish pistoles, some 80 times greater than the average racing prize of the day.

"Whenever they gave the bloodlines of a horse, they would always try to track it back to Selima to prove its worthiness."

Few details of the race survive. The only known newspaper account was a brief report in Annapolis' *Maryland Gazette* listing the order of finish and referring to the occasion as "great." But racing historians can help set the scene. For instance, although the jockeys went unnamed, many in the era were young male slaves, Gilcoyne says. And the era's typical handicapping weight—the amount each horse had to carry—was 140 pounds (10 to 15 more than the best American Thoroughbreds carry today) including the jockey and his riding tack. A trumpeter probably started the race.

It takes little imagination to conjure up the rest of the day's images: the taciturn Tasker sitting on racing's version of an unbeatable hand at poker; the confident Byrd unaware that he had been caught in a trap he had set for himself; hundreds of spectators spread across the race grounds, making wagers and shouting loyalties to Maryland and Virginia. "A great rivalry between the states started that day," Annapolis mayor Moyer says.

Selima won, followed by Tryal, Thornton's gray mare, and Tayloe's two imports, one of which later became a popular sire. The victory was monumental. Tasker and Selima were welcomed back as heroes in Maryland, having defeated not just the imprudent Byrd but all of Virginia. Selima's winning time went unrecorded, but the era's fastest horses covered four miles in about eight minutes. Today's best American horses seldom race longer than a mile and a quarter, the distance of the Kentucky Derby (though the Belmont Stakes, the last leg of the Triple Crown, is a mile and a half).

Virginia's racing community was outraged at losing so much money to an imported horse like Selima. New Yorkers no longer allowed such imports, which they called ringers, to race in their colony, and Virginians somehow believed Tasker had duped them. (Never mind that three of the horses Selima defeated, including Tryal, also were imports.) They banned all Maryland horses from competing in Virginia. "It seemed the feeling in Virginia was, 'You took our money, a lot of our money, and we're not happy about it,'" Moyer says.

Maryland breeders soon circumvented the ban by taking their pregnant mares to Virginia to deliver their foals, producing animals that were technically Virginia born and thus eligible to race there, even though they would be maintained in Maryland.

Selima's victory was "the beginning of the competition between Maryland and Virginia," says racing historian Francis Barnum Culver, author of *Blooded Horses of Colonial Days*, a volume self-published in 1922.

Selima was retired from racing after 1752, her colonial career as spectacular as it was brief, consisting of two victories in two starts. She proved even more estimable as a broodmare. Mated only with stallions imported from England, she produced ten sons and daughters, the first six for Tasker and four for Tayloe, who, when Tasker died in 1760, bought her for an unknown amount and moved her to Mount Airy. "Out of the ten, there was only one clunker in the bunch," says *Owner-Breeder*'s Anne Peters. "A lot of people presume a great race mare is going to become a great broodmare, but the reality is it seldom happens. Selima was the best of both. She not only dominated in racing, she dominated the breeding of her time through her sons and daughters.

"Out of all the mares that were imported in that era, she was the most influential."

Her most famous son was Selim, a temperamental bay foaled at Belair in 1759. Sold as a yearling to Samuel Galloway, proprietor of the Tulip Hill estate near Annapolis, Selim began competing at age 4 and never lost until he was 9, then continued with few defeats until retiring at 13. In his greatest victory, a virtual replay of his dam's finest moment, he defeated Yorick, a Virginia-bred chestnut, in a Chestertown, Maryland, race that took place in 1766 when the local gentry raised 100 pistoles to lure what Culver called "the two most famous horses on this continent."

Selima's offspring also included a succession of females that produced many generations of winners and champions. "For 50 years or more, whenever they gave the bloodlines of a horse, they would always try to track it back to Selima to prove its worthiness," says historian Baltz. "Selima's name appeared very frequently in advertisements long after she was gone. Hers was very much a special bloodline."

Her direct descendants included Lexington, the greatest American sire of the 19th century; Foxhall, one of the best American-breds that ever ran in Europe; and Hanover, win-

The redoubtable Godolphin Arabian (above, in a 1792 painting by George Stubbs) was one of three stallions to which all Thoroughbreds trace their ancestry. He sired Selima, who was born in 1745 at the second Earl of Godolphin's stud farm in England.

DETAIL: COURTESY OF ENCORE EDITIONS

ner of 17 straight races, including the 1887 Belmont Stakes. "Her [pedigree] line continued to produce the greatest runners America ever had," Peters says.

Selima's genetic impact was so profound that her name remained in circulation long after most of her contemporaries had been forgotten. Maryland's Laurel Park named a major race for her in 1926 at the suggestion of William Woodward Sr., a New York banker who then owned Belair, which was still one of America's top racing stables. (Woodward's son William was shot to death by his wife, Ann, in 1955 in a celebrated case that became the basis for Dominick Dunne's book *The Two Mrs. Grenvilles*.)

Much as Selima's abiding fame was prophesied in Gloucester, the race also augured Byrd's dismal fate. Undaunted by Tryal's defeat, he continued to import blooded horses and to breed Thoroughbreds, but he never took part in another major race.

He achieved respectability as a soldier in the late 1750s and early 1760s, commanding the Virginia Militia's second company, then replacing George Washington as the first company's commander. Later, he was an important administrator at the College of William and Mary. His family's prominent descendants include brothers Richard Byrd, a Naval officer who explored the North and South poles, and Harry Flood Byrd, a Democrat who was governor of Virginia and then represented the state in the U.S. Senate from 1933 to 1965. (Robert Byrd, the current U.S. senator from West Virginia, is not related.)

In 1756, he deserted his wife, with whom he had had five children, and later took up with a daughter of a former mayor of Philadelphia. Climbing up a chest of drawers in their home, his still distraught wife, according to one source, was searching for letters she believed would confirm his adultery. The chest tipped over, crushing her to death.

Byrd remarried and had ten more children, but he went deeply into debt after a tobacco glut led to a downturn in the market in the 1760s, and his hopes for recovery were undone by his gambling and expensive tastes. He put his holdings up for sale in a private lottery in 1768, but the return was disappointing. Pitifully, he thought the 1771 deaths of his mother and eldest son might save him, but he was largely ignored in their wills. "His family turned against him," says Tinling. "He had lost their respect."

With his debts overwhelming and his credit gone, he added to his troubles by favoring moderation rather than independence before the Revolutionary War, further isolating him from colonial leaders with whom he had once collaborated in society, politics and war. On the first day of 1777, at age 48, distraught and deeply in debt, he shot himself dead. "His life was a series of unfortunate choices," says Tinling.

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Walden's Ripple Effect

One hundred fifty years after its publication, Henry David Thoreau's meditation remains the ultimate self-help book ~ BY ROBERT D. RICHARDSON

Now a 439-acre state park, Walden Pond attracts 600,000 visitors a year and includes a gift shop run by the Thoreau Society.

"I went to the woods because I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach, and not, when I came to die, discover that I had not lived."

ON THE FOURTH OF JULY, 1845, a month and a half after Sir John Franklin set out from London with the ships *Erebus* and *Terror* to find the Northwest Passage, Henry David Thoreau set out from the family home in Concord, Massachusetts, to take up residence at nearby Walden Pond to find himself. He was not yet 28. He had a degree from Harvard College, he had tried teaching and failed, and he possessed some skill in surveying. He had almost no money, but he had friends, by far the most valuable of whom was his neighbor Ralph Waldo Emerson. Thoreau had built himself a 10- by 15-foot cabin with secondhand lumber on shoreline property at Walden owned by Emerson.

Thoreau (1856) once described himself "of a light complexion . . . slimly built."

Thoreau lived at the pond for two years, two months and two days. His idea was to conduct an experiment in simple living, to lead a life according to nature and to determine the real necessities of life. "It would be some advantage," he wrote, "to live a primitive and frontier life, though in the midst of an outward civilization." *Walden*, published 150 years ago this month, is Thoreau's report on this modest—almost backyard—experiment in getting back to basics.

The book is conceded to be a masterpiece and figures on every list of essentially American books, but in this day and age, we may legitimately wonder whether Thoreau's experiment in plain living has any meaning at all for a generation weaned on cellphones, the Internet and Nintendo.

I know that when I first tried to read *Walden*, at age 15, Thoreau did not speak to my condition or to my life goals, which were, at the time, to get a car and meet girls. Nor is he exactly easy to read: his sentences are not always as clear as "The mass of men lead lives of quiet desperation," and he can irritate a reader when he turns on him: "It is very evident what mean and sneaking lives many of you live." Finding this on page three of *Walden*, I put the book down.

I did not wake up to Thoreau until I was 40, though I had by then been teaching him, in an empty, pro forma way, for 15 years. One day, I found myself rereading Thoreau's essay "Walking," in which he tells about going to see two panoramas, one of the Rhine River

JOSEPH SOHM / CHROMOSOHM / CORBIS; BETTMANN / CORBIS

and its storied castles, the other of the Mississippi. (A panorama is a long roll of painted canvas slowly wound from one roll to another across a stage before an audience, a sort of precursor of the movies.) Looking at the unadorned Mississippi panorama, he writes, "I saw that this was a Rhine stream of a different kind; that the foundations of castles were yet to be laid, and the famous bridges were yet to be thrown over the stream; and I felt that this was the Heroic Age *itself*, though we know it not, for the hero is commonly the simplest and obscurest of men."

Though I had read and taught this essay many times, I now saw it, for the first time, not as a text, but as a truth. Just as Thoreau was startled to discover that his era, the 1840s and 1850s, was as heroic as the Middle Ages, so he had startled me into the realization that I walk in the same natural world that Thoreau did. Like that essay, *Walden* is a self-help book, perhaps the ultimate self-help book, urging us to show up for our own lives, to have the courage to find our own convictions and to try to live them out.

As soon as I understood that Thoreau was talking directly to me, the mythic Thoreau, the hermit of Walden Pond, the echo of Emerson, the isolated and lonely figure from America's rural past vanished from view. In his place stood a writer of immense humanity, vitality and humor.

Thoreau is a man of terrific intensity. We become aware of this through his passionate insistence on seeing—a "habit of attention" he once said he possessed to such a degree that it fatigued his senses. We all look at the same things, but some see more than others. "A single gentle rain," Thoreau observes in his chapter on spring, "makes the grass many shades greener."

Allied to his acuity of sight, his granting to every object a "separate intention of the eye," is Thoreau's great learning. Yes, he required a four-hour walk every day to keep in good spirits. But he also spent four hours or more every day at his desk, reading and writing. He read Virgil, Goethe, Linnaeus,

Orchestrating a blooming desert by Steven Yazzie

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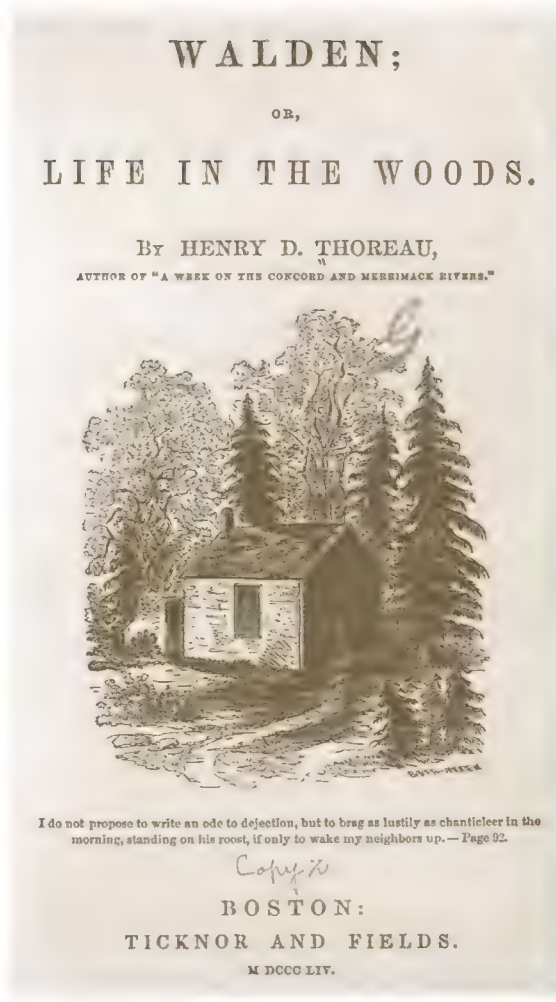
WALDEN;
OR,
LIFE IN THE WOODS.
By HENRY D. THOREAU,
AUTHOR OF "A WEEK ON THE CONCORD AND MERRIMACK RIVERS."
I do not propose to write an ode to dejection, but to brag as lustily as chanticleer in the morning, standing on his roost, if only to wake my neighbors up. — Page 92.
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The first printing of *Walden* (2,000 copies at $1 each) did not sell quickly.

Darwin and Ruskin. He read travel books, the classics, botany, zoology, philosophy, politics and economics. He was, in critic Edward Davidson's nice phrase, a chain reader. Like Pliny the Elder, who read or had himself read to every leisure hour, even in the bath, Thoreau apparently found no book so bad it couldn't be used in some fashion.

During his first year at Walden Pond, Thoreau cultivated about two and a half acres of Emerson's land, planting and tending potatoes, corn, peas, turnips and, chiefly, beans. What he didn't eat he sold. Contrary to popular belief, he went to town frequently, entertained visitors at the cabin and once even hosted a large picnic there for an abolition society. But mostly he worked at his desk, where he accomplished a great deal of writing. Drawing on a two-week-long trip to Mount Katahdin in Maine and his brief arrest in Concord for failing to pay his poll tax, he wrote essays on "Katahdin" and "Civil Disobedience" (which remains the preeminent American statement of the primacy of individual conscience).

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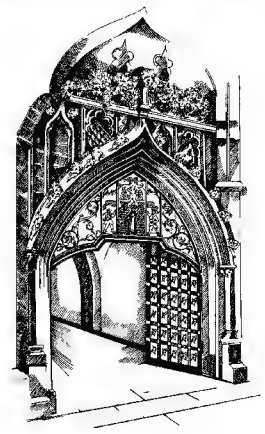

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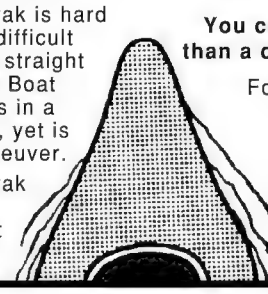

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"I had more visitors while I lived in the woods," he wrote, "than at any other period of my life."

He wrote one book (*A Week on the Concord and Merrimack Rivers*) and the draft of a second (*Walden*).

In his writings, and in *Walden* above all, Thoreau forged a thought-out way of life, a philosophy that insists that the individual turn not to the state, not to the gods, not to society, or even to history for a guide to life, but to nature and the self. But this turn to nature and the self should not be confused with selfishness. It is not the final destination but only the starting point of the examined life. Thoreau's social side is everywhere in *Walden*. "I had more visitors while I lived in the woods," he says in the chapter "Visitors," "than at any other period of my life."

Thoreau's second great achievement is one he shares with Emerson and other American Transcendentalists: the articulation of the social imperatives of their movement. If I wish to be free, the Transcendalists argued, then all must wish to be free, and none may be denied freedom. In the formulation of the African-American writer and leader Frederick Douglass, "there is not a man beneath the canopy of heaven who does not know that slavery is wrong, for him."

Thoreau's activism led him to make speeches and organize meetings to protest slavery, to work for the Underground Railroad, to defend the abolitionist John Brown and help get one of his men to Canada, and to write "Civil Disobedience." Walden is full of incisive social and economic analysis. "I cannot believe that our factory system is the best mode by which men may get clothing. . . . The principal object is, not that mankind may be well and honestly clad, but, unquestionably, that

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Thoreau drafted *A Week on the Concord and Merrimack Rivers* and *Walden* at this desk in his cabin.

the corporations may be enriched."

Thoreau's third great achievement is that he first articulated America's conservation ethic. When Thoreau said, famously, "in Wildness is the preservation of the world," he means the preservation of civilization too. "Our village life would stagnate," he wrote in *Walden*, "if it were not for the unexplored forests and meadows which surround it. We need the tonic of wildness."

Walden was published on August 9, 1854, to mostly good reviews, and it developed a small but steady following. It sold roughly 300 copies a year for the next 15 years. The naturalist John Muir read it, as did poets William Butler Yeats and Robert Frost. After a brief dip in popularity in the 1870s and early 1880s, the book began the steady climb that carried it through the 20th century and that shows no signs of slowing.

Thoreau's *Walden* speaks to our modern condition because it is mostly right about the big things. Open the book anywhere: One *should* beware of all enterprises that require new clothes. A person *is* rich in proportion to the number of things he can afford to let alone. Morning *does* bring back the heroic ages. The Universe *is* wider than our views of it. Heaven *is* under our feet as well as over our heads. The sun *is* but a morning star.

One hundred fifty years after its publication, *Walden* also remains a practical,

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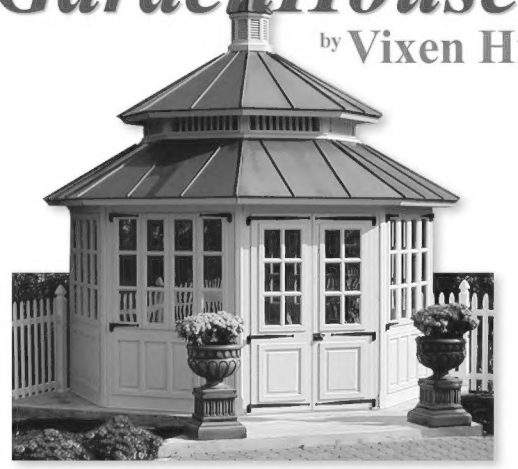

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usable manual on how to lead a good, just life. It offers readers an ethical view of life that begins in self-rule and ends in public and social commitment to the next generation. Gandhi picked this idea up from Thoreau, among others, and he put it with admirable pith and sinew. "[Real home rule] is self-rule or self-control. . . . If man will only realize that it is unmanly to obey laws that are unjust, no man's tyranny will enslave him," Gandhi wrote in *Indian Home Rule*. At its core, *Walden* is about the project of personal freedom, self-emancipation, which is where all pursuits of freedom must start.

Thoreau left Walden Pond in 1847, saying he had "several more lives to live." He stayed for a while with the Emersons; he traveled to Maine and Cape Cod. He read Darwin's *Origin of Species* and felt that it squared with his own observations. He spent years gathering material for a never-realized "Calendar of Concord," an ambitious design to record even the smallest natural fact about Concord and thus make of it a microcosm of nature as a whole. One day in 1860 while he was out counting the rings of recently cut trees, he caught a cold, which turned to bronchitis and then aggravated an existing case of tuberculosis. Thoreau died on May 6, 1862, as the Civil War was raging. He was 44.

Sir John Franklin not only never found the Northwest Passage, he never returned to England. His wife sent out expedition after expedition to find him. "Is Franklin the only man who is lost, that his wife should be so earnest to find him?" Thoreau asks in the conclusion of *Walden*. Then he gives us his final bit of advice. "Be rather the Mungo Park, the Lewis and Clark and Frobisher, of your own streams and oceans. Explore your own higher latitudes." That task is just as hard now as it was in 1854, and Henry Thoreau is still one of the best guides around.

ROBERT D. RICHARDSON is the author of Henry Thoreau: A Life of the Mind *and* Emerson: The Mind on Fire, *as well as a forthcoming biography of William James.*

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Of Mice and Mars

One small squeak for mankind

BY KEN BUDD

IN 2006, scientists from three universities will launch the Mars Biosatellite Gravity Program: the first mission to study the effects of Martian gravity on mammals. Researchers will pack a team of mice into an "artificial-gravity spacecraft" and rocket the rodents into an orbit 200 miles above Earth. Five weeks later, if all goes according to plan, these bewhiskered Buzz Aldrins will touch down in the desert of southern Australia, where they'll be studied for muscle atrophy and changes in bone structure. It's billed as a critical step in the ultimate goal of exploring—perhaps even colonizing—the planet Mars. And I am deeply opposed to the whole endeavor. Because the minute those mice are strapped into their tiny mouse seats, it will confirm—*irrefutably*—that mice lead more interesting lives than I do.

Mice.

The mammal equivalent of Fritos.

Animals so dumb they'll risk their lives for a speck of moldy cheese.

And yet these cellar dwellers of the food chain—rodents with brains the size of raisins—will be doing work far more impressive than anything on my résumé. After 20 years in the job market, I have yet to trigger a monumental leap in human achievement, much less get an office with a window. Nor have I blazed through Earth's atmosphere; or felt the jolting thrust of a rocket launch; or seen our glorious blue planet from the stunning perspective of space. And really, what are the odds that I'll *ever* see Earth from the stunning perspective of space? For that matter, what are the odds that I'll *ever* see Australia? The only thing I've successfully orbited is a lunch buffet.

I know I'm capable of so much more. Which is why I'm officially requesting that the Massachusetts Institute of Technology, the University of Washington and the University of Queensland—the three schools managing the project—replace their team of oblivious mousetronauts with the not-nearly-as-oblivious me. As I see it, the key requirements for this job are sitting and doing nothing: the perfect marriage of my two greatest skills. From a training standpoint, I couldn't be more ready. I sit for ten hours every day. I'm sitting right now. I'll even bring my own chair.

The fact is, if a new generation of Americans plans to take its rightful seat in the La-Z-Boy of human development, we must commit ourselves to one fundamental proposition: that the easiest and most desirable jobs be reserved for mankind. Geneticists will inevitably breed smarter mice, with brains the size of bigger raisins, and these erudite mice will compete with us for our greatest no-skill glamour jobs, such as game show host and commissioner of baseball. These smart mice will then lead to cyborg mice, with sophisticated artificial cyborg-mouse intelligence; and soon—much sooner than we care to realize—these tiny, electronically enhanced, big-eared eggheads (think Stuart Little on steroids) will steal not only our easy jobs, but our most difficult jobs as well.

After that will come the ultimate advancement: mice will send men into space. I'm preparing my résumé, just in case.

JOHN KLEBER

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